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ISSUE 47 ● AUGUST 1989 ● £1.45

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SERIOUS SIDE

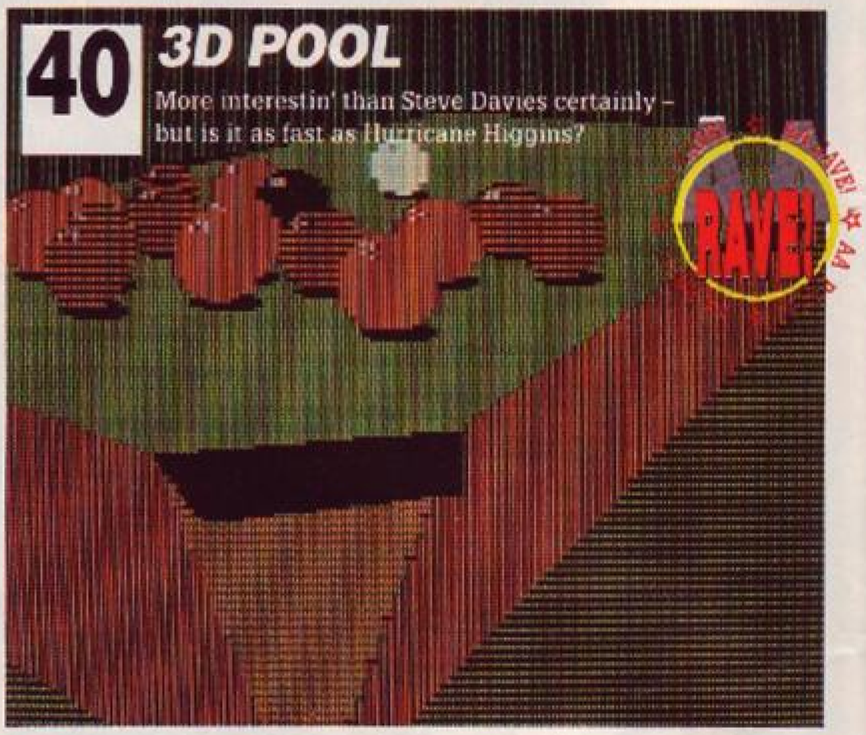
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ACTION TEST: page 40!





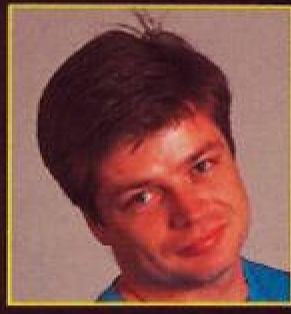
Write a bestseller

Cover feature this month on the serious side is Swift Software's games writing utility *Pandora* – see pages 16-17. It's something everyone who programs on the CPC will need to know about. The idea of a games writing utility that does rather more of the work, allowing you to put your brilliant games concept into operation, is infinitely appealing.

Writing software is a hell of a difficult task, as anyone who's ever tried will know. It takes real genius – and genius, after all, is 99% perspiration and 1% inspiration.

But the hardest part of writing a game, I'd suggest, is not the coding itself, tricky, time-consuming and perspiration-inducing though that is. No, the really elusive part is the inspiration. For every hundred run-of-the-mill shoot-'em-ups, vigilante punch ups, simulators and tie-ins there's maybe four or five truly innovative ideas in there.

So now, with our *Pandora* competition (see the review) is your chance. You don't even have to go to the trouble of writing the game – all you have to do is to provide that spark of genius. Twenty lucky winners each receive a copy of *Pandora*, and the best ideas will be published. And who knows, maybe one of the big software houses, who are always looking out for good games concepts, may take you up on it...



Steve





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Bad day for "black box" brigade

The Multiface, a device owned by thousands of CPC users for breaking into games, is dead. That is the sad news as of August 1st 1989, when the 1988 Patents, Design and Copyright Act comes into force. Established, amongst other things, to protect the software industry against professional pirates who make copies of software and sell them, the Act aims to define what you can and can't do with your software.

Hard Act to follow

Alex Goldscheider, boss of Romantic Robot, decided some time ago that he would stop selling the device on July 31. "At the moment, we're still seeking legal advice as to what our options are," he told *AA*. "Ideally we'd like to keep selling the product in the UK. But because it was probable that we couldn't actually do that, we ran several adverts to tell people that pretty soon it wouldn't be available.

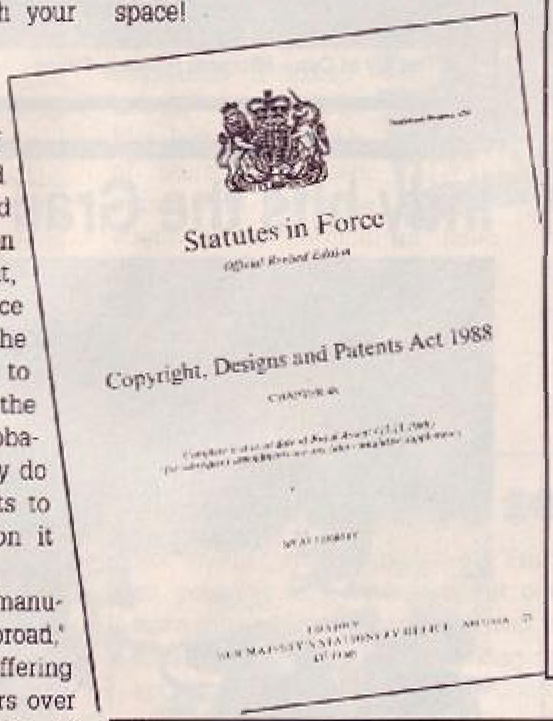
"It could be that we'll manufacture it here and sell it abroad," he went on. "We've had differing legal opinions from barristers over just what we can and can't do. At the end of the day, though, we don't want to do anything illegal – we'll take the most honorable course of action."

Economical with the truth

Goldscheider claims that the only complaints Romantic Robot have ever had came from Dave Marshall of Digital Integration: back in *AA*38 there was a memorable bust-up between the two, both accusing the other of distorting facts and misleading the public.

Yet despite the advertisements that Romantic Robot have been placing for the past few months stating that the end of the Multiface is nigh, it is by no means clear whether a successful prosecution could be brought. Legal eagles will recall that there was a hell of a fuss some years ago over an Amstrad twin-cassette unit advertised as able to copy tapes. In the end the judgment was that if a device has legitimate, legal purposes, and is not advertised as a piracy device, then it remains a legal unit, despite its copyright infringing capacity.

The plot thickens. Watch this space!


Statutes in Force

Official Revised Edition

Copyright, Designs and Patents Act 1988

Frantic Robot

So just what is in this big bad legislation? As always with Parliamentary Acts it's a mass of byzantine jargon wholly incomprehensible to the layman. But buried amidst the legal chicanery is the phrase "designed or adapted to circumvent copyright while being used in the course of a business." This is solely designed to guard against piracy.

The question remains though: do *Multiface* backups – for which a *Multiface* must be connected to the computer in order for them to work – constitute copies under the new law? Until a test case has been brought no-one can answer that question. Neither the man behind the Multiface, Alex Goldscheider, nor the man whose job it is to catch software pirates, Bob Hay, is in a position to act confidently.

It seems highly improbable, however, that owners of the device need fear arrest or imprisonment, for the Act is likely only to affect the mass sale of "black boxes" by companies such as Romantic Robot.

Meanwhile Romantic Robot's boss was keen to reassure his customers: "Of course existing owners will continue to receive support for faulty devices. If they're out of guarantee then these must be paid for, but we will honour our commitments to our customers."



● Goldscheider: whither Romantic Robot?

The hunter and the hunted

Bob Hay of the Federation Against Software Theft (FAST) is a man in two minds. The Act that received its Royal Assent on 15th November of last year is excellent news in that his job catching the pirates will be more clearcut. On the other hand, he has a massive task on his hands. No-one is expecting the pirates simply to shut up shop and turn to more legitimate ways of turning a buck simply because there's now a law to stop them.

Hay is cautious about the whole Multiface issue: "I've heard about it," he said. "I also saw the advert saying that they were withdrawing it from the market. Now offhand I can't say whether it's illegal under the new legislation or not, but I can describe the conditions for that sort of status.

"The key phrase," he went on, "is 'specifically designed or adapted to infringe copyright.' If a device falls within that, then as of August 1st it is outside the law to make, sell, hire, import into the UK or use as part of a business any 'black box.' The criminal code for that is section 107/1D, and indictment carries a two year gaol sentence plus an unlimited fine."



● FAST's Bob Hay: "Indictment carries a two year gaol sentence and an unlimited fine"

VAT man robs Micronet

Chancellor Nigel Lawson has ignored the efforts of Micronet to overturn his Budget imposition of VAT on online information services.

Despite a petition (submitted by modem, naturally) of over 3,000 "signatures" presented to the Chancellor protesting over the imposition of VAT, Micronet now appear to have little chance of reversing the decision.

The new tax came about after the Economic Secretary to the Treasury, Peter Lilley MP, had pointed out in the House of Commons that businesses that use online services to gain information charge VAT on transactions, so why shouldn't the charge apply to operations such as Micronet and Prestel?

After the online charge was implemented (7p a minute on peak rate) many fans left the system, claiming that the cost was unjustifiable.

Micronet's view is that the Government's decision represents the thin end of the wedge, and that general taxation of the press will follow.

"There is no excuse for this," stormed Micronet's Product Manager David Rosenbaum: "Either the Government is preparing the ground for the general imposition of VAT on the press, or they have made a serious error. We're taking a stand because we don't believe there should be a tax on information and we don't believe there should be different rules for electronic media."

One wonders whether Micronet would be quite so swollen with righteous indignation if paper publications were VAT rated and electronic ones not. Still, perhaps the blow will not be quite as damaging as Mr Rosenbaum fears.

Den of Cyn

Cynthia Payne, celebrity, ex-prostitute and broth... er, well, the party hostess to top them all, is now offering advice and solutions to personal problems via Micronet. Key *82855 for Madame Cyn's Boudoir. The cost of reading all those juicy details is 20p per problem and 15p for the reply. The replies take up several pages, and if agony aunt Payne is receiving cash for each of them, she should be onto a nice little earner.

Perhaps she can give Dave Rosenbaum some advice on how to stop that nasty Chancellor running off with 15% of his takings.



● The joy of Cyn – Micronet revels in Payne

Die, mutant alien scum!

Tecmo arcade shoot'em up *Gemini Wing* is getting the Virgin Games treatment even at this very moment.

It would appear that we the human race have grossly insulted the aliens of the galaxies with headlines in the *Someday Spurt* like "DIE MUTANT ALIEN SCUM."

They are now winging their way across the vastness of space to teach us some respect and let gutter press journos know how it feels to have their livers sucked out with a straw.

But they haven't counted on the famous *Gemini Wing* spacecraft. They think they're going to play "Fry the carbon kids," while we are just waiting to get into some serious vertical shoot'em up action.

As everyone knows we *homo saps* are real good at that stuff, so we'll bring you a war report as soon as our *Gemini* fighter arrives from Virgin HQ.



● *Gemini Wing* – coming in to land on your CPC imminently, if not sooner

Indy hits the Grail trail



Dr Jones the famous archaeologist and his son 'Indy' (named after the dog - not many people don't know that) are on the Grail trail. The guy with the nice line in hats, jackets and a kinky liking for whips has made his much heralded and highly profitable return. This time he has to face a multitude of nasty Nazis, but strangely enough only one beguiling woman, on his quest for the cup from which Christ drank at the Last Supper.

The game is now nearing completion in the deepest, darkest dungeons of US Gold. Based on the movie *Indiana Jones and the Last Crusade* the game is soon to hit the streets, whip and all. In order to get everything ready for a near simultaneous release with the film the 'Gold team have had access to the original script. But the Lucasfilm boys were so keen to stop script leaks that US Gold have been forbidden to say what happens in the game.

The action-packed movie should be a very fertile ground for computer games, so things are looking good. As soon the game is unleashed *AA* will rush you the review. But until then here's the theme tune, as hummed by the team: Dum da dum dum, dadada. Dum da dum dum da da da da *(sounds like "Love Story" to me - ed.)*.

Domark grab Bond's licence to print money





● It's Timmy as Jimmy in *Licence to Kill*

After years working on Her Majesty's Secret Service, 007 has turned in his badge and gone solo. Why? Why would anyone walk out on a well-paid job with good promotion prospects, nice staff canteen and a decent pension (if you live to collect it)? Answer: revenge. Some dimwitted drug smuggler has gone and crippled Jimmy's pal Felix (you remember, the plot mechanism for close escapes) – and on his wedding day too!

Licence to thrill

Now you can follow the vengeance trail and help J.B. right wrongs with the new *Licence to Kill* game from Domark, scheduled to hit the small screen as the film hits the big one. As with most film licences it takes key scenes from the movie and recreates the part for you to decide the outcome – and with James Bond as the source the ground for games sequences is exceptionally fertile. The film features a series of literally explosive stunts, and the game ought to be chockful of more action than you can wave a dry, shaken but not stirred Martini at.

You mission, Meesta Bond, is to track down Mr Leiter's assailant. *Thrill* to the action as you *swoop* through cities in helicopters, *swim* in sharks infested water and even *steal* a crop duster for one final action-patched, stomach-churning attempt to stop that nasty Sanchez – you can tell he's a baddie, he's ugly – from reaching the border and freedom.

Look in these very pages next month for the fullest CPC review of Domark's *Licence* licence.

Amazing: now Flippo takes on Skweek!

There'll be tears. No sooner has *Skweek* established his pink patch in the hearts of umpteen CPC owners than arch-rival Flippo threatens to knock him off his perch (or tile, as the case may be).

Mazemania from Hewson will be with us before you can say 'flip me.' Hero Flippo has to negotiate his way around a maze of tubular bells turning tiles as he goes.

If he manages with the aid of power icons to escape the black holes then a visit to the vegetable garden is next.

Meet us there for the next thrilling instalment of "the cutesy wars" in next month's twee *Action Test* for the under fives. (Only kidding: if it's half as much fun as *Skweek* it'll be worth playing. Emma Broadley tells us she's hardly left the little fella alone, much to his exhaustion.)

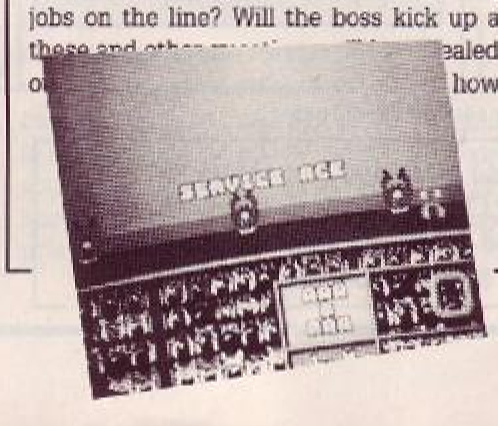
You *cannot* be serious!



Not another sports simulation? 'Fraid so, yes. But at least it ain't yet one more in the constant stream of soccer sims. This time it's tennis making an appearance on the Centre Play Court, or CPC as it's known, in the form of the Imageworks full price conversion of the Sega coin-op *Passing Shot*. The arcade features all kinds of shots available to the player who knows what they actually do: slice, lob, spin, smash and that funny shot that shoots off in a completely unexpected direction and hits the umpire.

You follow the players on the Grand Slam tour playing singles and doubles on clay and grass. To pep up the realism all the usual crew are there – ball boys, line and net judges to help enforce the rules and give you someone to shout at. If this is real tennis, though, where are the £1 strawberries and furious thunderstorms?

But why have Imageworks missed Wimbledon by such a margin? Were they aiming for an ace and serving a double fault? Are their jobs on the line? Will the boss kick up a racquet? The answers to these and other ... ealed just as soon as we can get o... however, hold your breath...



● Anyone for tennis? Yes, say Imageworks: above and left, two shots from the Sega coin-op. CPC version soon...

Competitions: the winners

We're all off to Wembley! Well, that's not quite true, but certainly **JOHN GORDON of Blackheath in London** is. His entry to the Audiogenic *Emlyn Hughes International Soccer* competition back in *AA*45 was by far and away the worst collection of bad footie puns it has ever been our excruciating duty to suffer. Here's a taste: "... Jones is on the ball. He falls off and passes to Sanderson, who shoots. The ref tells him to put the gun away. Sanderson hits the bar and knocks the drinks off..." *(that's enough John Gordon – ed.)*. John and a friend, who get the *AA* VIP treatment for the Charity Shield between Liverpool and Arsenal, will be submitting their match report for your punishment shortly.

● And our teeny weeny oh-so - inconspicuous-we-didn't-think-anyone-would-notice *Little Filler Comp* attracted a surprisingly large number of entries, too – close on 50, in fact. We wanted to know how many times the word Cecco appeared in last month's issue. You came up with various answers from four to 13 – and one genius who pointed out that "Cecco" doesn't appear in "this month's *AA*" (geddit?). Anyway, the lucky winner of the crisp, slightly salted, cheese'n' onion flavoured *AA* tenner is **Paul Papathomas of Barnet in Herts.**

● *This month's Filler Comp offers you another chance to win a tenner, provided you've read the issue pretty closely.*

Tell us, on a postcard or the back of an envelope, who tidied up the AA office this month:

AA Filler Comp # 2,
4 Queen St, Bath BA1 1EJ.

AEM2 is here

Number two of the *Amstrad Enthusiast's Magazine* is out now, with the fattest and most packed issue they've ever done (think about it). Send a mere 60p (cheque to Neil Selwyn) to *AEM*, Highfield, Coombe Keynes, Near Wareham, Dorset BH20 5PS.

Contributors, reviewers and other budding journo types are once again welcome, but don't expect huge fees.

● ***If you run a CPC fanzine, send us a copy immediately with all relevant details and we'll do our level best to fit you into next month's special on the Amstrad fanzine scene.***

REACTION

You read the best – and the daftest – letters in AA!

Another month has come round – so soon? – and once again the ed rips open your latest missives on matters CPC.

We do receive far more letters than we can print each month, but rest assured that every single letter is read and its contents taken into account.

Remember too there's a £15 SOFTWARE VOUCHER for one lucky winner every month. So don't forget it or just let it pass. Write now to:

REACTION, AA, 4 QUEEN ST, BATH BA1 1EJ.

But please don't send SAEs or expect a personal reply to your letter, because we are just too busy with the next issue of *AA!*

Address all mail order and subscription enquiries to: *Special Offers, Amstrad Action*, The Old Barn, Somerton, Somerset TA11 7PY. We can only pass on your letters, changes of address and so on, to them. Steve

●Subscribe and protest

Your mail order pages promise a: "great *AA* £20 subscription vouchers offer."

Am I thick, or do I have to spend £200 over a year to get £20 in discounts?

Now I'm not mean, and although I don't have a lot of money I probably do spend £200 a year on soft/hardware, but I don't see much of an offer when a lot of mail-order houses can beat your prices anyway, vouchers or not.

I was going to subcribe, but as far as I, and a few friends, are concerned, there is no incentive! At least when there were free games or a joystick on offer you did feel you got something for your subscription.

Steve McClay, Wallasey, Merseyside

● Please, please, please tell me: what is the subscription rate for *AA* to Australia?

Paul Petersen
Brisbane, Australia

AA: *To take Paul's enquiry first: the cost of a subscription down under – and indeed by surface mail anywhere outside Europe – is £23.50.*

Ask at your bank for a sterling cheque made out to Future Publishing Ltd and send it off with the order form you'll find in the back pages of every issue to our Somerton address (it's in the PS above). We can quote for airmail rates for Australia or wherever if you write to us, but the postal charge is so horrendous we daren't publish the price. (Jack Dekker, whose letter is up next, must be a real fan!)

Your letter is a bit more tricky, Steve, and I'm afraid what it comes down to is that we just can't please all the people all the time, however hard we try.

We certainly do like to give people something extra for making the commitment of subscribing. The free gift that we used to offer was never entirely satisfactory, since not every potential subscriber was enticed by the prospect of a game. Besides, we were making large orders for these games, and deals had often to be clinched long before games actually appeared. And as you all know, the finished product doesn't always arrive when promised!



" IT'S GREAT – GIVES YOU A CHANCE TO SHOOT HER DOWN IN FLAMES... "

● Broadley lets fly once again on p.14 – and features too in *Sugarman* overleaf!

The same is true of any free gift we might offer. Joystick? No thanks, I've got one. Mini Office II? Had it for two years already... and so on.

Hence the offer of a 10% discount, which should in theory be equally attractive to everyone.

And I must say, Steve, I'd challenge your assertion that our prices can always be beaten. To take a random example, I couldn't find anyone in last month's AA offering Stormlord any cheaper than we are – and when you send off your voucher you'll actually be getting it for under £9 on disk!

Finally, let's look at the actual price of a year's subscription to AA. Before the long overdue price rise a subscription was costing £16.50, which makes by my reckoning a mere 137.5p per copy, including post, packing and delivery to your doormat. Excellent value.

Now that AA costs £1.45, however, a subscription costs £17.95 – or less than 150p an issue. Don't tell the post office, but we're letting you have 19p worth of postage (not to mention packing) for just 5p! I would maintain that even without the extra 10% discount you get off any Mail Order purchases you may make during the year, at £17.95 there's never been a better time to subscribe to AA. Turn to the back pages of this issue for further details.

●CPC dies down under?

When I received the May issue of *AA* here down under (cost a fair bit by airmail but it's worth it) and read your editorial about the five more years I nearly started to cry. When you write that the CPC has never had it so good that hurts us here: you see the Arnolds are just about finished here thanks to Alan Sugar taking the dealershop from AWA and starting up as Amstrad Australia.

I am a member of the Southside Amstrad Users Group in Brisbane and when Amstrad took over early in the year and we saw the CPCs disappearing from the shops we started to wonder what was going on. Amstrad are only pushing the PCs and damn the people who made it possible for Amstrad to establish a base here in Australia. That the demand is

●Spellbrowned off

To: The Masters Of AA

Can the Oliver Twins spell? The reason I ask is because in a lot of their games there are spelling mistakes. This makes them look sloppy and not very professional, which the Olivers are supposed to be.

For instance, *Infa red detonator* and Snorkle in *Dizzy 2.* There are a number of others in *Dizzy 1.* Do I consult my Greek dictionary for the English equivalent? Perhaps these are meant to say Infra red detonator and Snorkel?

From: The Revealer, Goole

AA: We have to be careful how we answer this one, O Revealer, since we ourselves are occasionally guilty of the odd mistake or two in the spelling department. But we agree that these little things do detract from games.

This very morning we received a copy of Storm Warrior from Elite which proclaimed on the cover that it was "from the author's (sic) of Forgotten Worlds." Doesn't really inspire confidence, does it?

not so strong as it used to be is quite normal: if you don't advertise and there is no software on the shelves then don't expect to sell your product.

Our club has about 150 members, there are another four clubs here in Brisbane alone and there are many more clubs all over Australia so it is not a case that the CPC is not supported by Arnold fans.

Last week I went all over town and phoned all over the place trying to buy a program *(At Last Plus)* but no luck: all that was available were some dusty old games.

So Steve maybe you understand why we are drooling when we read all the ads in *AA*, maybe one day I might migrate to the old country (when you do something about the weather!).

Well that is it for now, keep the good work up with *AA* so that will keep us going and informed about Arnold (don't tell us about Sugar, we are not interested!). Thanks for reading the letter.

Jack Dekker, Alberton, Australia

PS I don't think my next computer will be an Amstrad. I don't like firms who don't support their product.

AA: *This is nothing less than a disgrace, Jack, and I can quite understand why you should be so angry about it. Still, we'd be kidding ourselves if we really expected anything different, wouldn't we?*

●Leave us alone, will you, *just leave us alone!*

(Last month we were daft enough to offer £10 to the person who sent in the most game-intensive football report. Can you stop now please?)

The *football director* of Rovers had just sacked *Brian Clough* because of his *football fortunes* and instead installed *Kenny Dalglish* as *soccer manager.* It was the *matchday. Emlyn Hughes,* the *international soccer* commentator had decided to rule the world by becoming the *Armageddon Man* by becoming the *track suit manager* of Rotherham United and accepting the *league challenge* against Rovers, the *treble champions.*

Roy of the Rovers kicked off by *savageing* the *hotshot, Gary Lineker* who had *superskills.* This is because his *soccer boss* ordered them to win *by fair means or foul.* Soon the match was caught in a *catch 22* when *streetgang soccer* erupted and *Peter Beardsley,* the *international soccer* and *rock star* also known as the *human killing machine outrun the gauntlet into the deep* and played a *1, 2, 3* with the *Robocop.*

Unfortunately, just as Rotherham were about to stop the *chickin chase, Brian Clough* decides to take *rigel's revenge* on the *football manager* and landed his *starglider* and embarked on a course at *star wars* giving a *command performance* with the help of *the in crowd* and the *arcade muscle* of the *Aliens. Emlyn Hughes* declared *Operation Wolf* and decided to repel the *vindicators* with the help of *Jack the Ripper.*

There was a *revolution in the national* stadium which lasted until nearly everybody was *killed until dead.* The *game* was *over* and *the footballer of the year* was the sole *survivor.* He had survived because he had been through a rigorous *combat school* which taught him *army moves* and that *every second counts.* The *stormlord* had survived the *720° firetrap.*

Matthew Cooper
Leatherhead, Surrey

AA: *I suppose we've only got ourselves to blame, Matt, but suddenly I feel very, very tired. Excuse me if I just go and lie down in a darkened room for a while...*

●A turkey never forgets

I've got some turkeys on cassette like *Sultan's Maze* and *Water Grand Prix* but they won't load. When I try, about half way through, it just says, 'Memory full,' and it's deterring me from buying better games. Is it just the games or can I do something about it?

Adrian James
Deeside, Clwyd

AA: *Several possible causes suggest themselves, Adrian. If it were only happening with one game I'd suggest that it was caused by a loading error or the progam not reserving enough buffer space. If it's the latter you could always do a*

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openout"d":memory 8ØØ:closeout
```

before running the game. But since it appears to be happening to lots of your games, the cause could be at your end. Do you have external ROMs connected, by any chance? Try unplugging 'em.

Why not get in touch with one of the Help Liners? *Matthew Cawley lives in your neck of the woods – at 42 Hamilton Av, Sandycroft, Deeside, Clwyd, CH5 2PB, to be precise.*

●Time for a moan

After three years of buying *Amstrad Action*, I think it's time to have a moan. Your magazine is better than the rest, because you don't bore people to death, except for boring bits like serious stuff, ie. if you connect this bit to this bit you make your Arnold into a microwave.

Please print something everyone can understand, like adding speakers to your sound thingy. I am a computer trainee, so I am not totally brain dead, but I bet a lot of people cannot be bothered to fiddle with long jobs. (I can't). Also, talking about long jobs, how about making *Type Ins* smaller? You must receive smaller ones.

Cheat Mode is probably the thing that sells *AA*, also reviews, so why don't you make your *Cheat Mode* bigger? Recently it's got a lot smaller. Also, if you get a poke for a game, why don't you print both tape and disk? It would make a lot of people happy.

Also, if all magazine are going up, does this mean fewer trees are being chopped down for the paper? If not, is someone making a packet? Like British Telecom (I think) they make a hell of a profit £200,000,000, but they *still* put up the bill!

Sorry for moaning, maybe it's because I am going to the dentist?

Mark Watson, Dewsbury, West Yorkshire

AA: *If only our readers agreed on what sells* AA! *You reckon it's* Cheat Mode *and* Type Ins, *Mark, but we get just as many letters asking us to scrap them as we do asking us to expand them. I can only conclude that in a magazine with so many different kinds of reader – and thank heavens for that, I say! – all we can hope to do is satisfy as many of you as possible at one time. On the other hand, I do appreciate your letters, because if it's only a certain kind of reader writing in – asking us to drop* Action Test, *say – then I'd have to start paying attention...*

Hope your visit to the dentist wasn't too painful an experience!

●A real classic

When was *Starglider* reviewed? What did it get?

J Gordon, Blackheath, London

AA: *The excellent space game got the AA treatment in issue 17 and was quite deservedly Mastergame.*

Even now ex-ed Bob Wade, who's a bit of a classic himself, still enjoys the odd game of Starglider *– when he's not too busy counting his money, that is.*



● *Starglider* – a real blast from the past!

●Model question

I'm taking a GCSE electronics course and I need to design circuit boards and test them while they are being designed on the computer. Do you know of any programs for the Amstrad (+ disk drive) that would suit me? I also need to design the shapes or the containers which the boards will go into. So what I need is a program that will allow me to create drawings in 2D, and then let the computer turn them into 3D images which I will be able to rotate and finally dump to a printer. Any ideas?

Andrew Manning, Manchester

AA: *Try Arnor's £20* Model Universe *(☎ 0733 68909) – let us know what you think, Andrew.*

●*Elite* – the fan club starts here?

We've had a veritable storm of letters in reply to 'Dangerous' Mark Gibson's plea for help in last month's *AA*. Mark, you may recall, found himself stuck on Coriolis space station without fuel and apparently with no prospect of acquiring any.

We haven't room to print all of your solutions, offers of assistance and *Elite* anecdotes, but here's a selection. (It seems to me we should start up some kind of *Elite* fan club for all you dangerous, deadly and *Elite* commanders! Send your name and 'phone number and we'll see if we get enough to make it worthwhile.)

The simple solution to Mark's problem seems to go something like this:

What he has is a mission: you get four of them, one after the other, when you get enough "kills." It doesn't matter, apparently, which planet you Hyperspace to. You get the same thing happening to you.

What you must do is get the most recently saved file and make sure you try an Intergalactic Hyperspace (from a planet with a tech level of 11 or higher) and don't use it until you get the sun going

When you arrive at the space station you will find that you lose all your fuel (as you said), what you have to do is this:

1 Dock with the space station.
2 When you receive the message from the station "The sun is going to nova, will you help us?", type 'y' for yes.
3 Now look at your cargo hold, and you should see that you are now carrying refugees.
4 Exit from the space station and as quickly as possible use your Galactic Hyperspace, as it requires no fuel!
5 When you arrive in the next galaxy dock with the space station which you are near.
6 When at the space station press key '3' as though you were going to sell some cargo.
7 You will now have released the refugees, and they should pay you a reward for your trouble. You have now completed your first mission!

That comes from **Andrew Manning of Manchester** (thanks too to **Bruce Sanchez**).

By the way, **Maurice Tam of Chelsea, London** reckons that the best planets to trade between are Laenin and Xexedi on galactic map one. They are only 0.8 light years apart and have opposite economic structures, so that you get a lot of profit from trading between them.

Also if you want to get into w[illegible]pace (that's slang for hype[illegible] pause the game and [illegible]ess 'F'. Doing it again gets you [illegible]. You do have [illegible] space after p[illegible] as w[illegible]

A more complex solution is offered by **D. Woofindin of Barnley in South Yorkshire**. Once in Solaega's airspace, proceed towards the sun to regain lost fuel.

Find the nearest planet to your local chart and press ' ' to ensure that planet is in your hyperspace system.

Now, with overflowing fuel tanks make your way to the space station blasting every ship in your path. Then dock and continue as before, carrying off the refugees.

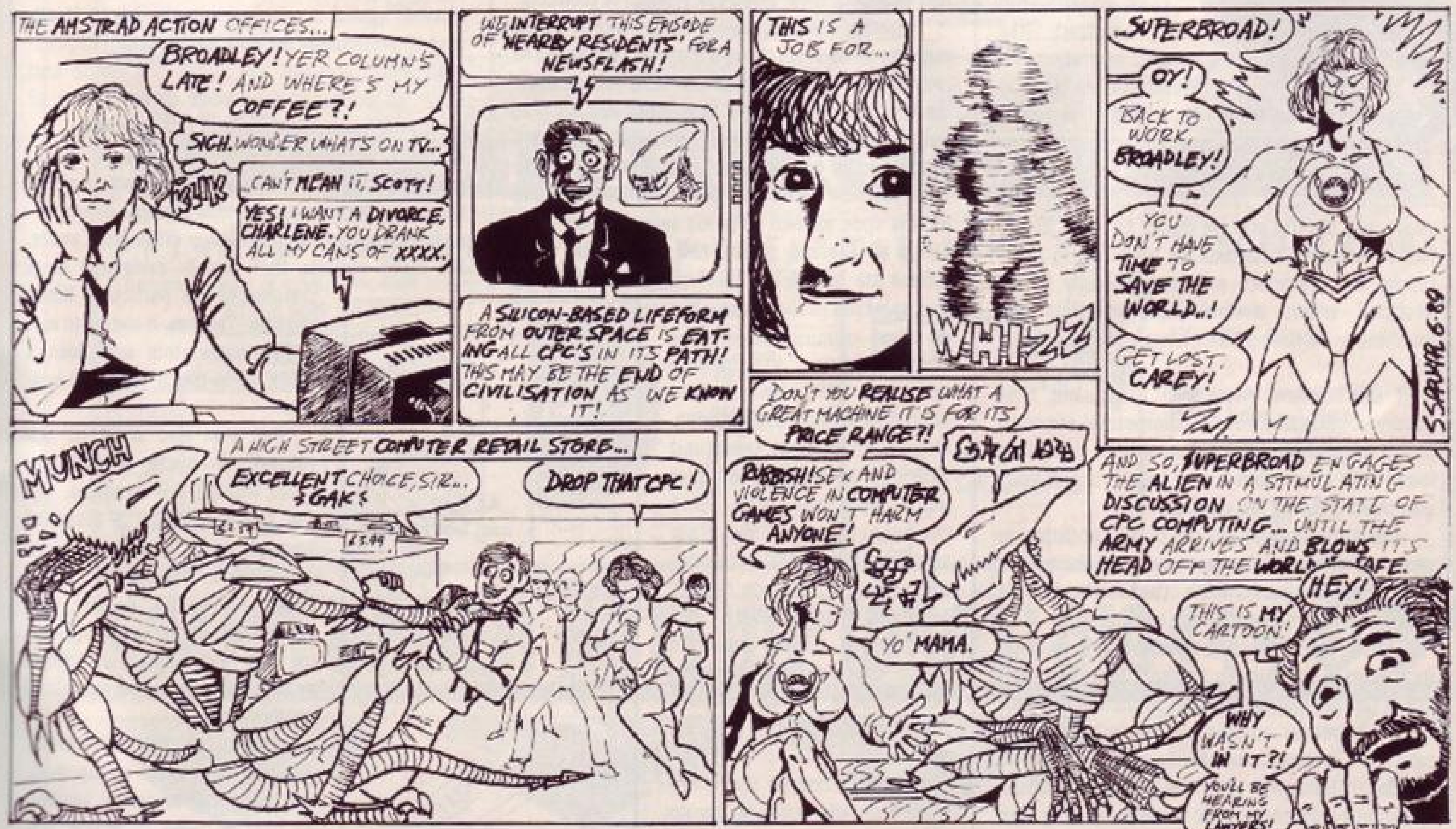
John Girvin of Belfast in Northern Ireland writes that he was given this mission first when he was only 'above average.' He's now made Elite status three times, but keeps losing the games files!

That charming chappie **Adrian Forbes** writes that he has the poke we published in *AA20*, as well as the instant hyperspace addition, on disk.

If you write to him, sending an SAE and a disk he'll give you a copy free of charge with same day delivery. Can't say fairer than that. Write to **Adrian Forbes, 37 Victoria Rd, Gourock, Scotland PA19 1DF** and say Steve sent you.

Entries to the *Elite Club* at the usual address, folks...

Sugarman



BROADLEY SPEAKING



As outrageous and bizarre as it's possible to get without being sued.

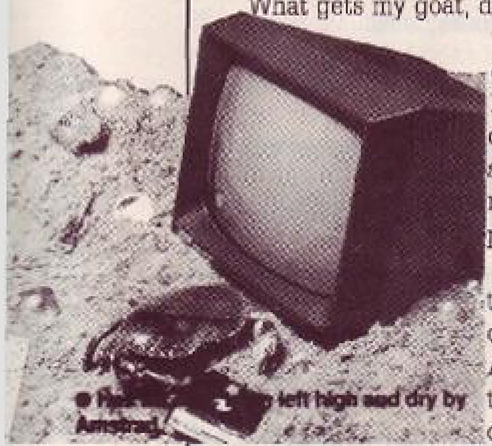
We hope.

EMMA BROADLEY dons combat gear for another assault.

I'm not a happy woman. No indeed, not happy at all. It's all to do with this latest Spectrum sales promotion Amstrad have launched.

Now I'm not complaining about the fact that the Spectrum is getting a big boost up the bundle – though my own opinion is that the punters could do themselves a favour and opt for the CPC instead.

What gets my goat, dear reader, is that in their infinite wisdom Amstrad have left the CPC to its own devices. No special bundle and no advertising campaign in the autumn.



• ... left high and dry by Amstrad.

I've heard too that Amstrad has ceased operations in Australia as far as the CPC is concerned.

It's all the more remarkable, then, that the machine Amstrad launched more than five years ago should still be doing so well. In the run-up to last Christmas an advertising campaign was planned, so I'm told, only to be dropped when it was realised that the machine was doing surprisingly well without it!

I don't know what you think, but that hardly sounds like sound commercial sense to me. If something is doing well you don't just leave it to coast along very nicely, thank you: you push it for all it's worth.

Amstrad appear to be doing nothing to promote the machine that launched them as a computer company. With that attitude, it's hardly surprising profits are tumbling.

We're the people who first put serious money in Alan Sugar's pocket, and now he's got it he has lost all interest in us. It's not perhaps altogether surprising, but what's really annoying is that it's so shortsighted.

You'd think that with his business acumen he would recognise that a machine that can keep selling in such huge quantities for so long must have something going for it.

The biggest expenses in the business of creating and flogging a computer, I'd have thought, are in the development and tooling-up stages. Once it's up and running these costs must surely drop to almost nothing.

Always eager to be of assistance, I hereby offer Amstrad this simple three point plan. If they follow it, I'm certain they will then be able to watch the CPC's profits soar:

1) cut prices officially: take £100 off the 6128;
2) advertise heavily;
3) and last but not least, *get the firmware manual back into print immediately!*

I'm no technical bod myself, but it does seem absolutely insane to me that the information so vital to serious CPC owners should be unobtainable. In fact, it's stupid.

● Still, at least we are getting the Magnum Virgin/Mastertronic lightgun, which is something. Be grateful for small Murphies, as the man said. I must be honest and admit that I haven't seen it yet – Steve tells me it has arrived *(yes: review on page 42 – ed.).*

It may be too little too late, of course, but it's better than nothing at all. In fact it's the best news we've had since Datel burst onto the scene and took over RAM Electronics' range of products.

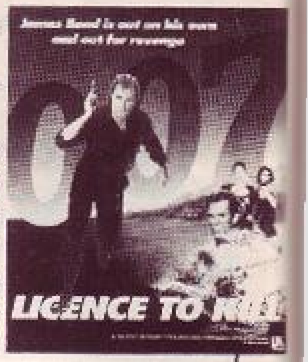
Whether the Magnum is a big success or not remains to be seen, though it seems odd to me to launch it in the middle of the long hot summer (fingers crossed!), when keyboards are said to gather dust and games collections remain untouched for weeks on end. (Mind you, I've never been too sure about that particular cliché, based as it is upon modest software sales figures. After all, if all the big games and advertising campaigns are aimed at Christmas, is it surprising that sales dip in the summer?)

● That reminds me, I've been trying to decide whether all this games licensing is such a good idea. Ocean have been shipping *Robocop* by the skipload ever since Epiphany, and more recently there's been *Run the Gauntlet* and the impending arrival of *Licence to Kill*, *Postman Pat*, *Gilbert the Alien* (he's taken rather a while getting here, though) and *Indiana Jones and the Last Crusade* (bet it isn't, by the way!).

Then of course there are all the arcade licences, by no means a cheap way of acquiring a title and concept for your latest project.



"BUT I ONLY SAID I DISAGREED WITH YOU"



On the one hand it's undoubtedly fun to find yourself involved in your celluloid hero's adventures – and I'll accompany Harrison Ford, sorry Indiana Jones, on any adventure. If you've seen the latest James Bond you'll actually have a better idea of what's expected from you in the game, and I dare say the same will be true of *Indy*, though it hasn't got around to my local Odeon yet.

On the other hand, isn't it true that vast amounts of money are spent on acquiring the licences in the first place? I know the rights to *Robocop* were acquired before the 'property,' as these people rather unpleasantly refer to films in the making, was anything more than a script. But apparently a top film licence could cost in the hundreds of thousands.



And when you're spending that kind of money you can't afford to leave a game's success to chance. Oh dear me no, there's advertising, point of sales promotion and 101 other things neither you nor I ever think of when we part with a browny and a bluey for the latest blockbuster in Smiths, Menzies or Boots.

So it isn't surprising if sometimes there isn't more than about thrupence left in the kitty to spend on developing the game itself, and if your first, second and lasting impression when you get the shiny box home and slide its contents into your drive is one of intense disappointment and bitterness.

● There is a solution, though. At least, in my opinion it's a solution. Read the reviews carefully. Of course the personal taste of Trenton or whoever is evaluating the game may differ from yours. It's fairly obvious that certain reviewers have preferences for particular kinds of game: Trenton, it seems to me, favours simulators and doesn't really go in much for shoot-'em-ups.

But you also need to ask yourself if you're a sensible, adult woman, for example, are you going to reach a plane of emotion much above complete indifference playing a game based upon the notion that you're a violent vigilante upholding the law blasting hundreds upon hundreds of bad guys into smithereens?

And if, on the other hand, you're a 14 year old young man, are you going to get all worked up over a game in which you attempt to save the osprey? ●

Open the box!



So you can't write Machine Code. Suddenly that's not the barrier it used to be: PAT McDONALD takes the wraps off a new package.

PANDORA

£24.95 tape ● £29.95 disk
Swift Software ☎ 061 456 0926

Bored with Basic, you sit there, drumming your fingers on the desk and wishing the programs you've spent half a lifetime perfecting didn't take the other half to run.

Very sad. There must be many with this problem of programs that just don't get a look in because they're in Basic. 'You could always write in machine code," some clever dick says. "Ha!' you reply: 'I'm not a megagalactic Skol drinking alien. And even if I was then I *still* probably couldn't understand assembly language."

What would be really good is if you could take all your Basic games and convert them to machine code without messing about re-writing them. It probably wouldn't be that easy, but there's got to be a better way than pure binary gibberish...

Enter the dragon

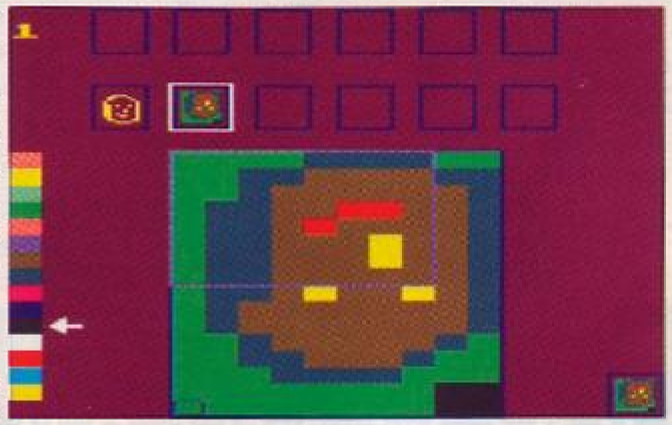
Pandora is a compiled version of Basic designed to take the sweat out of programming.

To write a program using it you first type out the relevant code into an Ascii word processor (*Brunword* – late version – and *Protext* are fine, *Tasword* isn't). If you don't have a suitable word processor, Swift have thoughtfully included a small program that stores the data as Ascii.

The *Pandora* Basic language is not the standard Locomotive variety built into the CPCs. Instead it's a sawn-off version lacking in certain areas (such as string and text handling) and built up in sprite graphics handling.

Sprites, of course, are an integral to almost every computer game, but as the manual says, you can ignore them if you all you want is a faster version of Basic.

The sprite handling is of a reasonable standard, though, and certainly offers exciting possibilities to the games writer.



● All sprites are edited on this grid

You can have up to 32 sprites driven along independent courses at the same time. 48 different frames can be held in memory at once, and different banks of sprites can be loaded when required.

One drawback is that sprites can't overlap very well – onscreen flicker is quite horrendous when this happens – and they also can't go in front of any background graphics. Still, it's early days yet, with this being only version 1.00...

Arcade action

When you have your Ascii file you must run it through the compiler program. This goes through the code looking for errors, and if it doesn't find any it turns all the Basic commands into a machine code file that can be run independently of *Pandora*.

Although not as fast as 'the real McCoy,' a compiled Basic effort is faster to write in order to get programs finished quickly.

So what sort of program could you write with it? Well, nearly anything is the disap-



● Entering programs is a cinch with a word processor

How it works

What makes compiled programs faster than ordinary interpreted ones? One of the main reasons is that all of the jumps to the various routines are precalculated.

Take the command GOTO 1000. A compiled program already knows exactly where line 1000 is, and can go there straight away.

An interpreted program has to sit down and calculate where to go. An immense waster of time is a looping routine.

If the program has to work out where to go each time, time is wasted unnecessarily. Compiled programs don't have that problem.

Pandora has a memory map that starts at &3000. Thus you can utilize from &0200 to &2FFF for your own purposes – data, perhaps, or a Basic program.

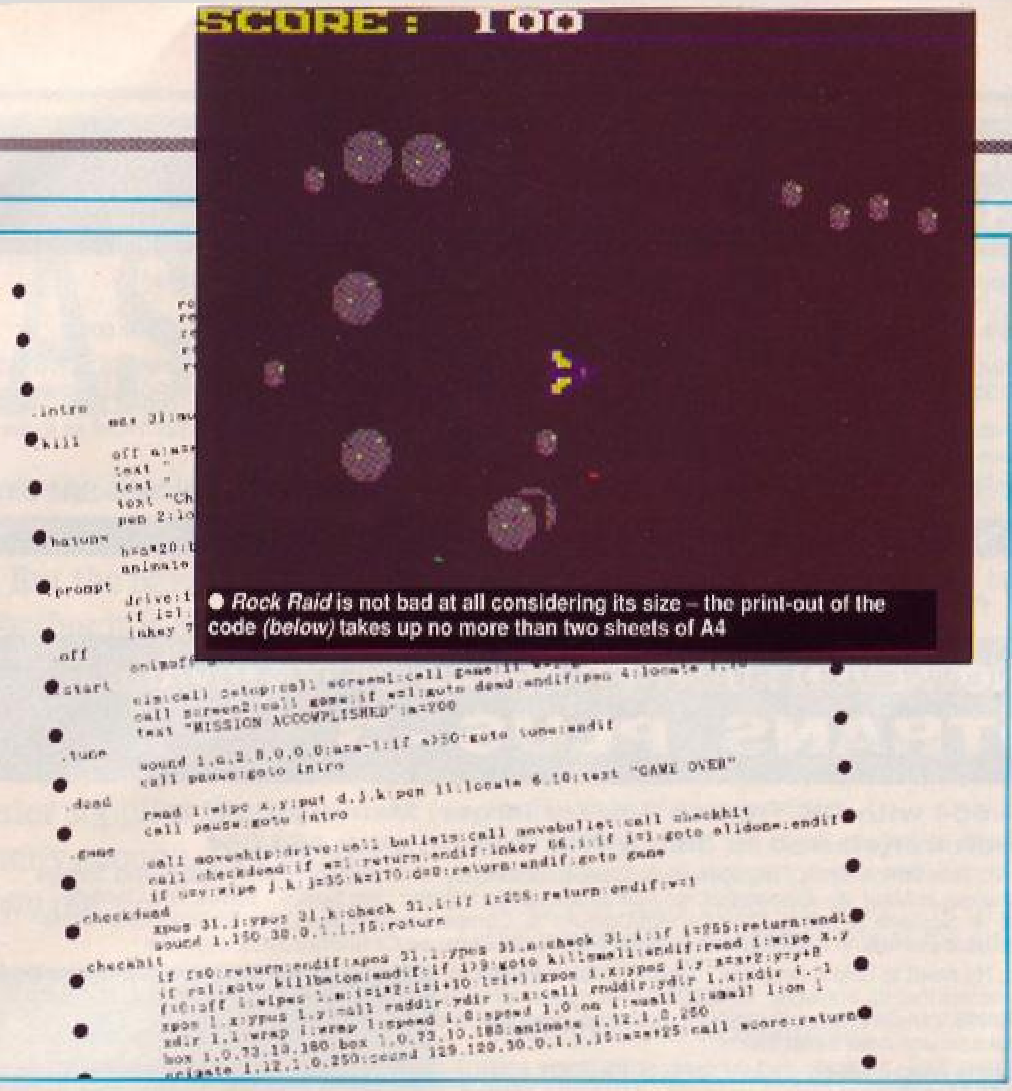
The compiled program can be 8K long, a fair but not overly generous allowance. You can however always use overlays – sub-programs loaded individually if a program is too big to fit in memory complete.

Screen output streams are all disallowed – so no text windows. In fact, in version 1.00 text handling is a little primitive, relying on printing characters one at a time, though increased speed partially makes up for this.

If, as intended, Swift release an updated version of *Pandora* able to run independent machine code routines – possibly stored in memory below the compiled program – this product can be transformed.

A routine that needs speed, such as a new longer lasting graphic FRAME command (see *The Look*, *AA41*) could be added without fuss.

Extra text, disk and sound handling could be added too. Perhaps a user club may be born to keep track of all the different patches, tweeks and short cuts, as happened with Incentive's *Graphic Adventure Creator*.



● *Rock Raid* is not bad at all considering its size – the print-out of the code *(below)* takes up no more than two sheets of A4

pointingly vague but uncompromisingly accurate reply.

The only tricky area is when you try to drive the sprite routines past their limits. What you get is superfast sprites that flicker. You'd be writing something along the lines of *Silkworm* before this got to be much of a problem.

Another limitation is the lack of a real meaty data area. OK, so you can use the bottom end of memory *(see the box)* but you're not going to squeeze a DTP package into it.

That leaves spreadsheets, art packages, finance planners, utilities, adventure games, and of course arcade games.

The standard of finished game that can be achieved using *Pandora* is admittedly unlikely to reach *Mastergame* status: on the other hand, budget games wouldn't be a problem.

If you played around with overlays, it would be perfectly feasible to create a mega disk-only game. ●

Adventures in history

There have been other programming utilities for the would-be professional (ie money-earning) programmer. The *Laser Genius* series *(Laser Basic* and *Laser Compiler)* fulfilled much of the same purposes as *Pandora*. But they did not contain a separate dialect of Basic, relying on Locomotive and lots of RSXs to deliver the goods. This approach has the virtue of simplicity but the vice of consuming lots of memory.

There have been others, but none really up to the standard of *Laser Genius*. One area which did produce a flurry of programming aids was the writing of adventure games created with *PAW*, *The Quill*, Incentive's *GAC* and Camel Micro's *Genesis*. The problem was that, although they produced professional looking programs, games written with them all looked very much alike.

Pandora's advantage is its superior flexibility. Expect to see professional programs produced using it before long.

GOOD NEWS

- **Very flexible.**
- **Clear, friendly manual.**
- **Future updates likely.**

BAD NEWS

- **Rather expensive.**
- **Needs to be able to use external machine code programs.**

- Swift Software began by offering the Arnor range of utilities on disk and ROM. They've just completed a 10,000 word, 1,000 main subject heading Thesaurus/word finder, *Keyword*. It too costs £29.95 – look out for the review in next month's *AA*.
- Next release is a disk of sprites and sound effects for *Pandora*, expected to cost £10 tape/£15 on disk.
- And later in the year there's a similarly priced compilation of the best games created using the program – with royalties being paid to the authors. So get cracking now!
- By the way, get your order for either *Pandora* or *Keyword* in before the end of July and you receive a *free* calculator/watch!

The competition you just cannot lose!

To celebrate the release of what looks like becoming an important addition to the CPC software catalogue, *AA* in conjunction with Swift Software have 20 copies of the program to give away *absolutely free!*

An even better reason for entering, though, is that you just cannot lose. Because every entrant will receive a £5 voucher that allows you to buy *Pandora* at £24.95.

Entering this no-lose competition couldn't be simpler. Well, it could actually, but for some reason people always say that when they're writing about competitions, so who are we to buck the tradition?

You have a choice of how you enter.



Either creat a game concept which could be written using *Pandora*. It could be a serious idea for a brilliant new game, or a daft idea for, say, a new pram simulator or whatever (blimey, we'd never win with ideas like that!). You're limited to 100 words, so don't waste space saying, "My idea, and I think it's a dead good one..." Just get on with it!

But if you don't fancy that, you could submit a brief description of an innovative new feature you'd like to see in a game creator. Swift are very keen to update and improve *Pandora*, and the best way for them to give the people what they want is for the people to tell them.

So get your entries off before the end of August to: *Pandora Giveaway, AA*, 4 Queen St, Bath BA1 1EJ.

Note to people living overseas: yes, we know what you're thinking. But if we put a date for the competition to close some time in 1990, noone is going to bother entering.

So even though the competition closes at the end of August, if you write to the same address given above, you will still receive a £5 off voucher, regardless of when we get it. *(Offer subject to availability.)*

NEW! FEATURE

SAS ENCORE!

We gave the *Stock Accounting System* a thorough going over in *AA42*. But the only way to find out whether it is really up to the mark, you might think, is to hand it over to someone such as STEVE PALMER, who uses it to run his computer supplies shop.

Funnily enough, that's just what we did...

STOCK ACCOUNTING SYSTEM
£39.95 ● 128K disk only
SD Micros ☎ 0462 675106

Ooh, ooh! I was as excited as any piece of business orientated software could make me. Was this truly the answer to all my prayers? I wondered. As the months unfolded, if that's what months do, I would find out...

The *Stock Accounting System* includes sales ledger, stock invoicing, statements and stock control, with disk utilities and a mini calculator. Impressive, I thought: just about everything I'm looking for to make invoicing, statements and stock control easy!

Limited – liability?

Scanning through the manual I gleaned the following information:

- Credit accounts: 99 credit customers plus unlimited cash customers
- Suppliers: 40 suppliers
- Analysis groups: 10 groups i.e. hardware, games, education or nails, screws, brackets, wallpaper these groups are used for Analysis or break down of sales
- Stock: 750 different items of stock can be accommodated
- Max stock sale price £9,999.99
- Max stock level for any one item 99,999

So I could use this program to help run my business with its invoicing, statement and stock control facilities. The only drawback was the 750 items of stock restriction.

I decided to use the stock control to keep track of hardware and peripherals such as joysticks, disk boxes, leads and so on. However, the invoicing and accounting side of the programme was ideal.

Getting down to business

The next thing was to get stuck in. But what does one do with a 22 page naff manual printed on dayglow orange paper? After three attempts to get going using it I quite simply threw it away in disgust and set about getting into the program by trial and error.

Soon it all clicked into place. What the manual is *trying* in its own sweet way to get across is that you have to set up several files and input information *before* you can start to use it. Oh, I *see!* If only they had put an example in the manual guiding you through the set-up procedure – i.e. a hardware business! Then, when you set up the package for your own business it would have been a lot easier.

First I had to enter my credit customers' details. Each is given a number 01-99 (00 is reserved for cash customers). Then I had to input my 10 product analysis from 0-9: for instance, 0 nails, 1 screws, 2 brackets, etc. These two inputs are done from the sales ledger. Next I entered the Stock control menu and input my products 1-750, like this: 1, six inch nails; 2, four inch nails; 3, two inch nails... well, you get the idea.

Now this seems staightforward enough;. And so it is. But the manual leaps from one page to another, and soon had me in a right old two and eight *(er, state? – ed.)*. This, together with the wearing of sunglasses to read the manual set me off on the wrong foot.

Bad news

All in all user friendliness is not *Stock Control System's* strong point. Make a mistake in parts of the program and there is no way out. Try to save a file and select load instead or visa versa (easily done) and there's just no way of knowing until it's too late. Bang goes a day's work.

Finally the general display of the program lacks the professional look and feel that *Plan It*, *Mini Office* or *Tasword* have. And an option to customise the colours of the display would help – I absolutely *hate* orange on black!

Happy days are here again

Now for the good points. The package is a genuinely useful addition to any small business needing to generate invoices and statements. And if your stock fits into this program then you'll find that the stock control features are excellent.

The stock control keeps track of stock reference number (part number); Description; Unit quantity (eg 10 disks per box); Supplier reference number (whom bought from); Cost price (how much you paid for it, ex VAT); Sale price (how much you sell it for, ex VAT); Minimum stock level (gives you stock low warning); Stock level (how many you have in stock); and Location (where the item is, bin number, shelf and so on).

On balance

All in all this package is an invaluable asset to my business, and congratulations are in order to SD Microsystems for producing it. My only reservations are the manual and the general look of the program, which could have been more professional.

The way in which all this useful software has been made to work on the 6128 is a feat in itsself. It's a must for any business using Amstrad CPCs. ●

Order, order!

Let's run through a fictitious order from a customer for 1,000 X 6 inch nails and 4 bags of cement.

First boot the program and enter stock invoicing. This customer has a credit account with us, so we select credit sales.

The program asks for the date, customer's account number, invoice number (automatic), brief description of sale, VAT code (3 options: 0%, standard 15% (alterable), and exempt) and analysis code. After confirming the data you are put into the invoice mode. The presaved address of the customer is put in automatically. The delivery address is assumed to be the same but you can change that.

Then you can put in a customer order number, if any. Next you're asked to input the items bought and price. Here is where the stock file comes into play. The first item is 1000 X 6 inch nails (100 per box) The programme asks for the qty: you put in 10.

Next input is item number. Let's say six inch nails are item one on the stock list. Enter 1. The item is now displayed. You are then asked if there is any discount.

The program then works out the price, ex vat. This process can be continued up to 20 items per invoice. When all items are on the invoice it will then add them all up, work out the VAT and be ready to print out the hard copy (as many copies as you require). Then, when you have finished invoicing for the day, you save a batch file and add it to the sales ledger file.

When payment is received it is a simple matter to adjust the sales ledger in auto or manual mode. The program keeps track of payments – and more important non-payment – so that you can simply generate statements.

The sales ledger also keeps track of financial totals, receivable accounts, VAT and analysis of sales, all of which can be output to printer.

● Do you know a piece of software inside out? Would you like to share what you've learned? We aim to make *Encore* – the *AA* update, a regular section. Write an assessment like this one and you could earn yourself £50 or more! Send us your *Encore* on a disk (we prefer *Protext*, but any word processed or ASCII file will do) and a printed copy to: *Encore, AA*, 4 Queen St, Bath BA1 1EJ

HELPLINE

NEW ENTRIES

Murdok signing off. Thanks for the kind letter, mate, and all the best – Steve

Over a hundred pokes, tips and mega-maps.
Martin Dillon 176 Coal Clough Lane, Burnley, Lancs BB114NJ ***Nominated as 'Number One Helpliner' by Sarah Drummond of Ayr in Scotland. Well done Martin, keep up the good work!***

Matchday II, Buggy Boy, Tetris, Nigel Mansell's Grand Prix, Soccer Boss, Jet Bike Simulator, Super Stunt Man.
Craig Thomson. ☎ (0698) 51177. ***And Sarah thanks you for your help too, Craig***

Help wanted on Cybernoid, Eidolon, Mystery of the Nile and ooh heaps of other games.
Nagina Begum, 90 Glebe St, Walsall, West Midlands WS1 3NU

Anyone got a copy of The Boggit on tape to sell?
Paul Bird, 25 Castlefields Lane, Crossflatts, Bingley BD16 2AB

Help wanted for Football Frenzy & Roy of the Rovers
RJ Gullen, 24 Liddesdale Rd, Hawick, Rux Scotland, TD9 OES

Help available for problems with Dr Logo, comms (in Ireland), Amsprite or Basic sprite making. Also posters made out using AMX Stop Press, greeting cards or banners. Standard 20p, draft 10p, NLQ £1.

Screen dumps 20p a page/per screen dump. Send SAE with disk or letter to
Morgan Fitzgibbon, 97 Greenwood Estate, Togher, Co Cork, Ireland

Basic & M/code – debugging, routines, hacking (games since '85), loading problems, ROMS & MFII. In fact, just about anything really...
John Girvin, 25 Moorgate St, Belfast BT5 5BZ, N. Ireland. ☎ 658939

Pokes, hints & maps. Send middle-sized SAE for list
Jeffrey Almond, 183 St Helens Rd, Eccleston Park, Prescott, Merseyside L34 2QB

Help with almost loadsagames; tons of keypress cheats. Can also help with adventures. Phone first & if I have a long poke &c I'll send it on.
James Griffiths, Passby House, Lysonnen Rd, Carmarthen SA33 5DX ☎ 026782 443, 4.15pm-7pm Mon-Fri

Penpals wanted. More than 1,000 titles both on tape & disk including most new titles. Reply promised
Mustafa Dag, Eski Osmanli SK 8-8, 80310 Mecidiyekoy, Istanbul, Turkey

Loads of games. Send SAE
Kevin Poast, 147 Monks Park, Wembley, Middx HA9 6JP

Help with Basic programs, music. Send listing of program and SAE. Also penpals willing to exchange letters on mini office – send cassettes
Desmond Coughlan, 7 Abbotsford Place, Cumbernauld, Glasgow G67 4BJ

Desperately seeking penpals, overseas contacts welcome. Send SAE if overseas
F. Rutterford, 77 Howdale Rd, Downham Market, Norfolk PE38 9AH

Lots of Multiface pokes up for grabs! Send large SAE
N. Howell, 1 Turner Rd, Biggin Hill, Kent

Help with Basic and m/code, debugging Basic progs (send tape and enough stamps for return: no discs). 464 tape problems, Rams & romboards, joysticks, ram Music machine, Midi, General CPC problems (hardware/software)
Peter Harrison, 38 Lynmouth Drive, Wigston Fields, Leicester LE8 1BP

Desperately seeking penpals! Help on the Advanced Music System
Mark Turner, 7 Campsey Rd, Southery, Downham Market, Norfolk PE38 ONG

Penpal wanted to swap games &c. I have 6128 & Cannon PW-1080a printer. Interested in wp; games (Target Renegade, Ikari Warriors, Driller, Total Eclipse & others)
Christopher Bowler, 318a Wrythe Lane, Carshalton, Surrey SM5 1AF

Help with Bonze, Meddler, Blitz and Doo Dah. Enclose disk inlay as proof of ownership (alright Colin?). Also help with Heroes of Khan and Forest at Worlds End
Mick Hopewell, 55 Hawthorn Cres, Arnold, Nottingham NG5 8BE

Through the Trap Door – anyone got it on tape? I can't find it anywhere
Kevin Murphy, 136 Main St, Lennoxtown, Glasgow, G65 7DA

Need help bad on Army Moves, Green Beret, Last Ninja II, Platoon, Frank Bruno's Boxing (yup, Frank Bruno's boxing need help bad alright! – Steve)
Brian Mays, 81 Hollyfield, Harlow, Essex, CM19 4NB

Please please please *(that's enough pleases – ed.)* anyone interested in games & reading *AA*. I'm 14 and anyone will do
Simon Williams, 24 Chalcot Drive, Hednesford, Staffs WS12 4SF

Maps for copying – over 60 including Dizzy, Thrust, Driller, Dark Side, Exolon, Trantor & others. Send 15p per map for photocopying. Penpals wanted too!
Anthony Treacy, 60 Ruskin Rd, Kingsthorpe, Northampton, NN2 7SY ☎ 0604 71605

Basic programs written (price on application). Basic & Pascal programs debugged: send disk or tape stating program. (10p per K of program tape; 15p per K disk)
Craig Willcocks, 105 Kent Avenue, Minster, Sheerness, Sheppey, Kent ME12 2DX

Help! I need a picture digitised ready to use on *Stop Press*. I'll send the picture to you with an SAE
Stephen Thompson, 5 Pendragon, Great Lumley, Chester-le-Street, County Durham, DH3 4NA

Will supply any help for Mirage Imager and supply any digitized video picture for Advanced Studio. Loadsa games/utilities
Matthew Clover, 10 Lacon Rd, Bramford, Ipswich, Suffolk ☎ 0473 43811

Loads of maps, pokes and tips for new and old computer games
Mark Watson, 106 Mountain Rd, Thornhill, Dewsbury, West Yorkshire, WF12 OBP

Help on disk drives, printers, Protext, disk backup, tape to disk Multiface and tape loading problems
Someone from Thanet who forgot a vital bit of information: name and address! Wake up matey! – ed.

Will print listings & screens 10p per page, send tape/disk. Help on AA Studio, Tasword, DMP2000, DKTronics Speech ROM, customising cassette recorders/ joysticks/computers etc.
David Carter, 28 Mt Hermon Rd, Woking Surrey GU22 7UH

Penpal wanted to share tips and pokes
Iain Thomson, 13 Millhill Ave, Kilmaurs, Kilmarnock, Ayrshire, Scotland KA3 2TA

Maps, tips, codes, pokes on over 250 games, AMX Stop Press. Penpals wanted!
Jay Redfern, 10 Oaktree Close, Mansfield, Notts NG18 3EN

Tips & cheats (no pokes) on Asphalt, Get Dexter I&II, Dizzy, Wizball, Ghosthunters, Super Stuntman, Grand Prix Sim, Super Robin Hood, Sorcery +, Green Beret, Driller. SAE & 10p per game
Alistair London, Maryfield, Strath-martine, Dundee, DD3 OPW

19yo 6128 owner wants penpal who can program M/C so he can learn
John Mullen, 62 Lonsdale St, Workington, Cumbria, CA14 2YD

Ireland only: utilities: disassembler, real time clock, disk search, 6128 extra memory commands. All m/c. Send tape/disk & padded SAE to
D.J.Daly, 'Amber Pines', Annmount, Glounthaune, Cork, Eire

Feeling helpful? Just send your name, address, phone number (say if you don't want it printed) and subjects on which you're offering help to: *Helpline*, Amstrad Action, 4 Queen Street, Bath, BA1 1EJ. *Please write on a postcard or the back of a stuck down envelope* and keep it short or you won't get in (or you'll get cut to 'loadsagames').

If you want help contact the appropriate Helpliner – not us. By post include a self-addressed, stamped envelope for the reply – or you won't get one. And phone only in decent hours!

Piracy is not welcome: don't try it, you'll get booted off. Keep it legal. And if you receive SAE's, for heaven's sake return them with some acknowledgement. If you want to come off *Helpline* just write and say so.

All comments are the editor's.



PRINTERS

24 pin ups

Thinking of upgrading to a 24 pin printer? PAT McDONALD gets his paws on a pair.

SEIKOSHA SL-80AI

£299.99 + VAT
☎ 0753 685873


● With a bigger buffer than the Star the Seikosha has more themes (you can do more with it)

If you find it reassuring to have your printer weigh in on the heavy side this hefty Seikosha beast – at about seven and a half kilograms – should put your mind at rest.

It is not too wide or deep, but is taller than the Star. The printer cable goes to the rear of the printer, making it conventional in operation.

Continuous stationery goes through the printer with the aid of the tractor feed attachment. This is easily removed, but putting it back is more fiddly.

Strangely enough, the feeders themselves cannot be locked in place: if the printer is on an uneven surface, or the paper not quite aligned, the printer soon chews up the sprocket holes on the paper. Another danger for the unwary is the distressing habit the printer has of feeding the top of the paper into itself again...

This last problem is easily remedied with the paper separator, which apparently doubles as a cut sheet feeder. As noted in the Star review, these are handy gadgets that hold magazines of cut sheets.

When you first start printing, you can't help but notice the slow, smooth speed at which the paper feeds through. This isn't very helpful if you're after a quick print, but there is a good reason. The Seikosha is set up to feed slowly and carefully: this means that it's very good at printing on cut sheets, simply because it takes its time to match them up. If you want to regress to the usual slapdash approach, there's a button on the front panel to return you to the normal speed of 70 characters per second in draft pica.

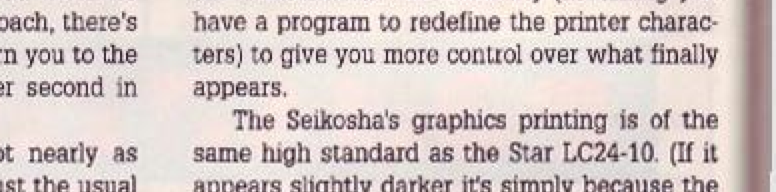
The front control panel is not nearly as impressive as the Star, featuring just the usual on/offline button, formfeed, linefeed and speed controls. The reason for this is that it doesn't have any extra fonts, just the usual pica and elite, plus emphasised, condensed, proportional and so on. Examples of all the effects are included in the manual, which lists all 128 possibilities.

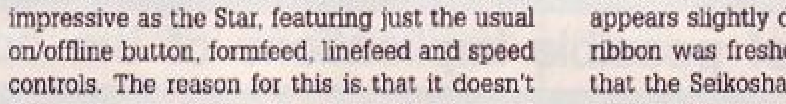
Instead, the printer has an impressive 16K of space to upload extra fonts to. As each font takes up perhaps 6K-8K, the space isn't there to emulate the extra fonts of the Star. However, the Seikosha has the flexibility (assuming you have a program to redefine the printer characters) to give you more control over what finally appears.

The Seikosha's graphics printing is of the same high standard as the Star LC24-10. (If it appears slightly darker it's simply because the ribbon was fresher.) However, it must be said that the Seikosha is a second or two faster at printing the same picture.

The SL80A1 has fewer features than the Star. To be fair it is cheaper and has more versatility, so really it's a question of whether you're prepared to put some effort into creating fonts or you're prepared to pay for an easier life.

● JD Cunningham of Bessbrook didn't quite make it into this month's *Look*, but here's what the SL-80 makes of his picture of Garfield, together with some samples of text printout





Pinning down the difference

A few years ago, the only dot matrix printers that you could buy were nine pin efforts. This meant that the actual printing process was carried out by a column of nine pins. When printing a line, the print head moves across the page, and the dots are produced or not according to what your computer tells the printer to print.

24 pin printers are much the same, except that the print head has a column of 24 pins, improving the resolution of the characters and producing much better quality print.

STAR LC24-10

List price: £399.99 + VAT
(but Action for example - ☎ 0800 333 333 - sell it for £100 less)
☎ 01 759 0005

Similar in appearance to the LC10 (available with colour printing ability - see the *Colourdump* review over the page) the LC24-10's cable connects at the side, meaning that you don't get the cable mixed up with the paper feed, a not uncommon problem with certain other printers I could mention.

The Star is a page eater and no mistake. It prints at around 150 characters in draft pica per second, significantly faster than all 9 pin printers.

Loading single sheet stationery is routine - a cut sheet feeder is included, as with the Seikosha. This means that a magazine of sheets is available to be printed on: good news as it means that a lot of the labour of document printing is now gone.

Continuous stationery is slightly less orthodox. At the back of the printer is a plastic spring-loaded cover. This must be removed in order to load said paper, which is a bit of a bind. It doesn't look particularly pretty either. It is, on the whole, a good thing though, because you can load either kind of paper without fiddling about fitting different feed systems. The height of the printer is also kept down as a result.

The front panel of the Star is worthy of special mention. From here you can control the number of characters per inch, whether or not proportional or condensed mode is in use, and various fonts and typestyles. The bleeper on the printer sounds as each move is made, which together with the Christmas tree of lights, reassures you of just what you're doing.



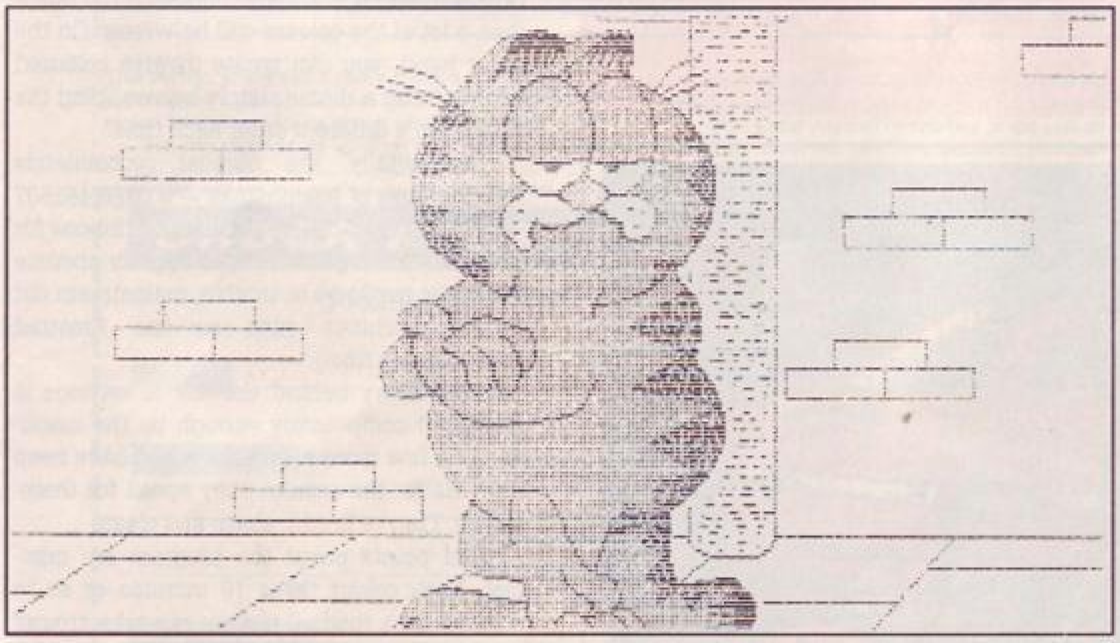
● ... but the Star's built-in fonts are more varied

Each of the fonts looks excellent - there's less need to resort to *Qualitas* any more! Characters can also be printed up to four times their usual size, so that decent-sized headlines can be produced quite easily.

Extra fonts can be plugged in on a memory card. If blank memory is used instead, then the Star can have new character designs uploaded to it from a font designer, or alternatively it can be used to increase the size of the printer buffer, which means that your CPC won't spend so much of its time waiting for the printer.

There is little to choose between the Star and the Seikosha as far as graphics printing is concerned.

All in all the LC24-10 is a very sound design, easily capable of out-performing any 9 pin printer, and indeed the Seikosha, on most points. The only shortcoming is in the size of the printer buffer - 7K compared to the SL80's 16K. However, with the superb front panel, the printer taking up less space, and the extra built in fonts, the Star is the superior printer. Not that I would expect anything else, considering the price difference.



● Here's Star's attempt at Garfield and some sample text printouts - very little in it

ORATOR IS OK I SUPPOSE
Oops! Back to standard size
ITALICS? GETTING GOOD!
Script italics are a bit much though
Script for the bookish type
Courier is the standard font

Verdict

So which 24 pin printer should you buy? There's really nothing in it as far as print quality goes: it would take a very discerning eye indeed to tell the difference. The chief thing that distinguishes them is speed, with the Star performing about twice as fast as the SL-80.

The choice comes down to font usage. If you just want standard pica and elite, or don't mind designing fonts yourself, plump for the SL80.

If, however, like me, you want a few special effects and an easy life, the Star is the better buy. The front panel display means that you don't have to fiddle with printer control codes, and the different fonts themselves should be sufficient for most needs.

Prints charming

One day, they said, your colour prints will come. That day has arrived, as PAT McDONALD reveals.

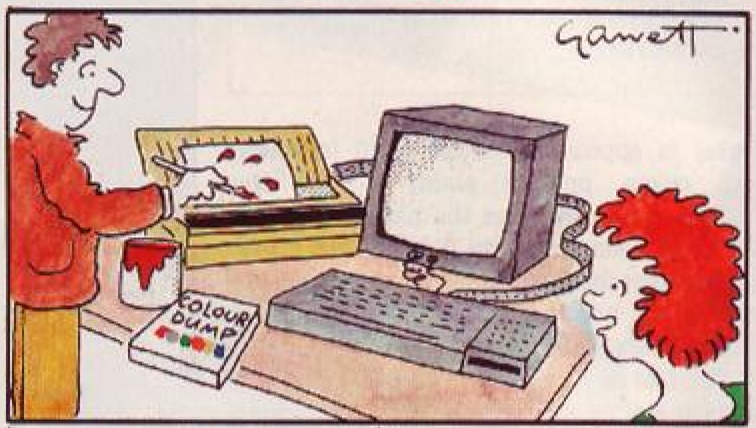
COLOURDUMP

R.J. Moss, 15 Heyworth Avenue, Romiley, Stockport SK6 4NF
£9.50 disk - £7 if disk supplied: all CPCs

The display of an Amstrad CPC is far superior in terms of colour and resolution to its 8-bit cousins: you need only turn as far as *The Look* on page 36 to see examples of the impressive range of subtle depth, highlighting and shade you can create on a picture.

There are programs to let your artistic bent flood out – *Advanced Art Studio, Melbourne Draw* and of course Robert Buckley's *Smart 2* from *AA37*. But there is one underlying problem to all this art: how do you keep a permanent record of it? You can't really keep your monitor turned on all the time.

Most printers available on the market can handle small dots and so on: the problem is that they can't really handle the colours. Until now. With *Colourdump* you can produce mode 0 or 1 hard copies of screens in glorious colour, on virtually any printer that is Epson compatible.



"SOMEHOW, I DON'T THINK YOU'VE QUITE GRASPED THE IDEA"

Star maker

For the Star LC10 four colour printer (reviewed in *AA32*) *Colourdump* has a set of routines to take advantage of its capabilities. The examples on this page were mostly done using this printer.

Such routines aren't commercially available – though your on-the-ball, topical, user-friendly *Type Ins* just happens to have a listing this month for that very purpose!

The way the program extracts colour performance from a black and white printer is quite clever: you run a sheet of paper through the printer with a particular coloured ribbon or piece of carbon paper. At the end of the page, the printer reverse feeds back to the beginning, and requests you to change the colour medium.

The program works down through the picture, splashing a colour mix that has been set up to your own specifications (there is a default setting) and eventually the whole screen area is covered.

Of course, if you get the colour mix wrong for the different ribbons – say you put a blue ribbon in when when you needed a red one – then a lot of the colours will be wrong. On the other hand, you can create diverse coloured variations on a theme simply by swapping the ribbons in a different order each time.

(Incidentally, the manual recommends HSV Supplies of Basingstoke – ☎ 0256 463507 – for supplies of different coloured ribbons for printers. Although owners of slightly obscure machines might be in trouble, mainstream dot matrix machines such as the Amstrad DMP2000 are fine.)

The theory behind the colour settings is explained competently enough by the manual, but a few more examples would have been nice. As for the results, they speak for themselves. They're bright, sharp and clean.

Bad points about the program are minimal. Each colour takes 10 minutes or so to achieve, so a mode 0 picture can take around three hours to print out. Another niggling point is the small size of the screen dump: it's approximately A5 size, and not really suitable for a poster.

Colourdump is a good, competent program that fills a hole in the CPC market. Upgrades – such as for a larger screen dump for instance – would be warmly welcomed, but *Colourdump* is nonetheless a worthwhile expenditure on its own. ●

GOOD NEWS
- Produces good effects on an 'ordinary' printer...
- and even better ones on an LC10.
- Price is nice, too!

BAD NEWS
- Small dumps only.
- More cost on ribbons or carbon paper.
- Fiddly to set up – the manual lists 12 steps.



● Pacman (by David Knight) and The Car (Marcus Jones) came from last month's *The Look*. The print outs are clear and bright, though at anything up to three hours per composition you'd better not be in a hurry!

AA SMALL ADS

FOR SALE

CPC464 colour monitor, software, magazines, books desk. £200 ono Telephone 01-866-1004.

Premier Pack. A suite of quality productivity tools for CPC's . Includes word-processor, database,and art package. £9.95 cassette, £14.95 disc. Send money to Archer software, 9 Pemberley Avenue, Bedford MK40 2LQ.

Amstrad C464 cassette colour monitor, excellent condition £400. Eleven well known games included in price. Telephone Yvonne on 0276 66521.

The new reach out collection! Speech, brilliant graphics! 18 great programmes +3 games free! Only an incredible £2.49 tape, £4.99 disc! Over 150K! Art studio 2, Coffee Shop, Diary, Database, Barchart, Ghostmania, Treasure + more! Add 40p (p & p). R D Griffin, 6 Charles Road, Frome, Somerset BA11 1NT. (0373) 63389.

Sexy Games' Adult Trivia game on cassette only. Contains language suitable for persons over sixteen only. Will only accept cheques for £5. David Shaw, 21 Balfour Court, Kilmarnock, Aryshire KA3 7TD.

DDI-1, floppy disc drive with interface for CPC464, complete with CPM 2.2 only £60. Tel (0235) 22043. (Oxford area). Ask for Robert (after 6pm).

Excellent Modeo Art program. Supplied on disc at only £6.00. 6128 only. Includes free disc manager program. Buy now! Postal orders to: James Davidson, 73 James Nisbet Street, Glasgow G21 2QL.

Would you like to learn more about Logo? More about the different aspects of Logo? For more information send letters to: Morgan Fitzgibbon, 97 Greenwood Estate, Togher, Co Cork, Ireland.

CPC464 colour monitor DD-I disk drive, joystick, manuals, lots of games, magazines, PAW, Assembler Tutor. Good condition. £275.00. Tel (0952) 812112 ask for Tim.

CPC6128, colour monitor, built-in d/drive , tape deck, joystick, books, over £100 software, misc games etc excellent condition, worth over £600 asking £295 a great buy. Telephone 0271-77741 Barnstable Devon.

Amstrad CPC464, colour monitor, DMP-1 printer. Light pen, and games including Operation Wolf, Microprose Soccer, Afterburner, Target Renegade, Dragon Ninja, Crazy Cars 2. Sell for £495. 0280 813759.

CPC464 colour monitor, disk drive, printer all in excellent condition, hardly used. Also software on cassette and disc. Send SAE for list to Ian Stewart, 58 Whinbank, Ladywell, Livingston, Scotland.

Wish you could run multiface files without multiface? You can with Autonomy! £9.95 on disc 6128 only. Cheques/POs to Electronic Innovation, 11 Sermon Road, Winchester, SO22 5NU (SAE for details).

Use Ransacker with your Multiface! Stop any game any time and search for pokes for any counter- infinite lives, ammo, fuel, you name it. Also changes counters in mid game! No programming knowledge needed. Easy to follow instructions. Printers supported. Incredibly fast only £9.95 on disc. Cheques/POs to Electronic Innovation, 11 Sermon Road, Winchester, SO22 5NU (SAE for details).

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Football program with all results for divisions 1-4 season 88-89 including team colours, league tables etc. fully menu driven (250K) only £1.99. Tahir Ghani, East Tarbert, Isle of Harris PA85 3DB.

Brain teasers . Four games to make you think! + Scoop! and Klondike. Play cards against human, computer or solo. Over 52K. Transferable to disc. £2. Paul Robson, 23 Park Lane, Middlesbrough TS1 3LQ.

CPC Home Executive! Personal accounts, card filer, shopper, diary/calendar utilities. Prints on standard or organiser paper. Summer offer price £14.95 (tape/disc). SD Micros (AA) PO Box 24, Hitchin, Herts. Tel (0462) 675106 SAE for details.

Stock clearance! Dr Who and Mines of Terror CPC cassette, absolutely free! Just send £2.00 to cover P&P Cheques/PO to Software bargains, Northwood House, North Street, Leeds LS7 2AA tel 0532 436300.

Turn your DMP2000 into a colour printer with COLOURDUMP. See AA45 page 8. Send £9.50 to R Moss, 15 Heyworth Ave, Romiley, Stockport SK6 4NF tel 061 4303917.

Screen Dump for Star LC10 Colour printer. Send £9.50 to R Moss, 15 Heyworth Ave, Romiley, Stockport SK6 4NF. Tel 061 430 3917.

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Would you like to earn £3.50 per hour mailing envelopes for a publishing company? SAE to May Parkes, 35 Lorne Street, Reading Berkshire RG1 7YW.

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Extra Extra		17.99
Stop Press inc Mouse		62.99
Art Inc Mouse		60.99
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Taspell		11.99
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Tassign		19.90
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Prospell		16.95
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NO ! CPC PROCOPY *IS* the BEST !!

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(1 FULL A/B DRIVE CAPABILITY.
(2 CAN ALSO ARCHIVE TO TAPE.
(3 MAPPING & GAP 3 ANALYSIS.

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***A** NO! And no more questions either! BSM copes with all so called "normal files", and the majority of heavily protected games - see the list on the left of this advertisement!! The total number of tape to disc transfers by BONZO SUPER MEDDLER & HACKPACK is NEARLY 1000!*

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***A** NO! The strike rate is even - one game that "theirs" doesn't do is WIZBALL - BLITZ does! Neatly balances MUTANTS we'd say. BLITZ is cheaper, works on all machines and is easy for us to keep up-to-date.*

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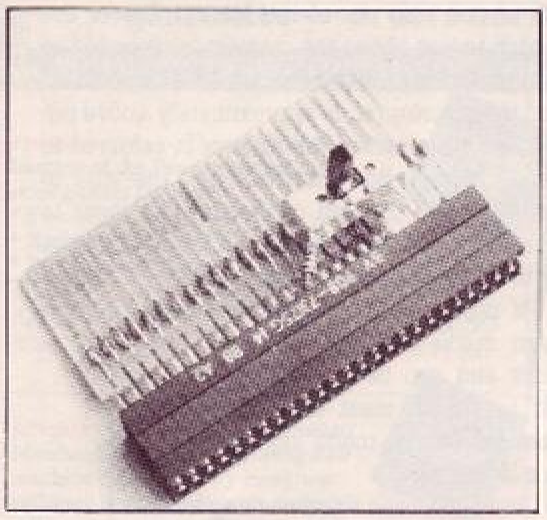
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AA in virus spoof!

Well, not *AA* as such. More PHIL CRAVEN, W.A.R.T.S. and all, with a piece evidently written under the influence of too much cough mixture.

In recent months there's been a lot of publicity about computer viruses. What with the April Fool's day bomb types, the general purpose screw-up-your-programs types and the dangerous invasion of the NASA computers, all working on other kinds of machines, we CPC owners have led a charmed existence. So far none of these pesky little viruses has seen fit to infect Amstrad's finest.

Until now, that is. For your correspondent has uncovered what is possibly the most insidious and deadly virus of them all... WARTS. This lethal menace kills all external ROMs – dead. Fortunately no virus, including WARTS, is invincible. After much brainstorming, many sleepless nights and the ed's signature on a commissions contract *(news to me –ed.)*, I can announce that a 12 month subscription to *Amstrad Action* works as the perfect antidote to WARTS.



● This is what you end up with – or should do!

The boards that like to say "YES!"

WARTS is known to work with the following ROMboards: Rombo, KDS, Circuit, Super Power, Micro Power, Maplins, Morrison, and Brittania. It works with the Romboard Xtra but, alas, it also knocks out the 6128 ROM. Other extinct boards will almost certainly be disabled by the switch but haven't been tested.

Seriously though, folks

Since most external roms allocate an area of memory for their own use, some more than others, and reduce the free memory pool, some software is prevented from running when too many of them are attached. Often the software checks the space available and, if there isn't enough, it comes back with a pesky "Turn some ROMs off' type message. Others simply crash. Either way it becomes necessary to either switch the ROMs off or unplug the board.

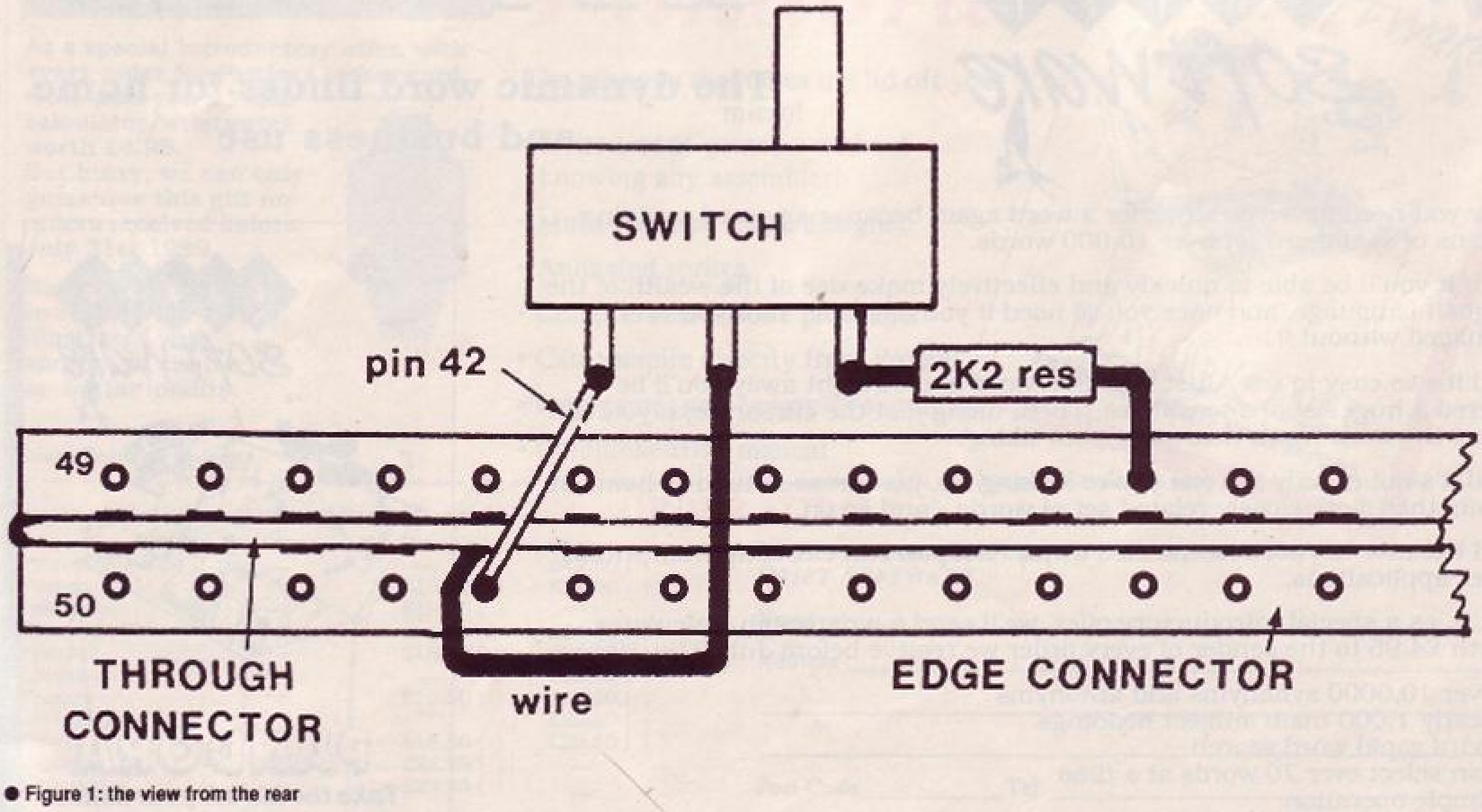
Only the Microgenic board has a switch to do this. Some of the others have tiny individual switches for each ROM which are not exactly easy to flick off, especially if the board is boxed, while the rest have no switches at all.

Unplugging the board is just as inconvenient. Hence WARTS, which is clearly a tortuous acronym for "Whizzo All ROMs Toggle Switch." It allows you to turn off all external ROMs however many boards are connected –

Parts

The two 50 way connectors, wire wrap edge and through, the 2K2 resistor, the switch and wire are available as an *AA* exclusive WARTS Project kit from my own Microstyle, 212 Dudley Hill Road, Bradford, W. Yorkshire, BD2 3DF ☎ 0274 636652.

The kit costs £4 including postage, packing and a whacking great profit for yours truly, oh what a giveaway. *(You won't be wanting payment for this article then, will you Craven? – a tightfisted ed.)*



● Figure 1: the view from the rear

but it won't affect the internal system ROM. The parts cost a mere £4 and the project takes just a few minutes to make.

And this is what you do...

Whenever the CPC accesses any ROM it sends the ROMEN signal, pin 42 of the 50 way expansion connector, low. All ROMboards use this signal to determine whether or not the address and data on the buses are intended for a ROM.

If they are, then the particular ROM is enabled. It follows that no ROM can be enabled where ROMEN is not allowed to go. If we prevent it from going past the WARTS and out to any ROMboards then the external ROMs cannot be enabled.

And that's precisely what we do. ROMEN is intercepted and fed to the pole or centre of the switch while the switch position feeds it on out to the ROMboards or leaves it hanging in the air. A pull up resistor is included to improve reliability.

Making it

The 50 way edge connector has a locating key and only fits the CPC one way round. Be sure to get it the right way. In your User Instructions, chapter 7 page 40, you will find the pin connections of the expansion socket. Bend the ROMEN pin 42 of the edge connector right down flat between pins 41 and 39 so that it touches neither. Squeeze the rest of the two rows close together. Put the through connector between them, making sure that its locating 'slot' is also the right way round, and solder the rest of the edge connector's pins to it. Don't solder the pin you have bent down. Leave about a 3/16" gap between the edge and through connectors.

Strip about 3/16" of the insulation from each end of the wire, solder one end to the centre pin of the switch and bend the two outer pins slightly away from the centre.

Now solder the resistor as closely as possible to one side pin of the switch. Lower the switch to just above the connector assembly so that the wire passes between 37/38 and 35/36 and the resistor pin is approximately above pin 33. The other end of the resistor is soldered to pin 27 of the edge connector and the wire to pin 42 of the through connector. Cut them to size and solder accordingly. Solder the bent pin 42 to the other side pin of the switch.

If no accidental connections have been made then the unit will now work and can be tested: but before we finish we must ensure that the bent pin cannot touch any other pins at a later time.

For this I used woodworking adhesive which I squeezed between the pins having made sure they were correctly positioned.

It has the advantage of drying rigid, and also adds to the stability of the switch. Further stability can be gained, after testing, by adding more adhesive.

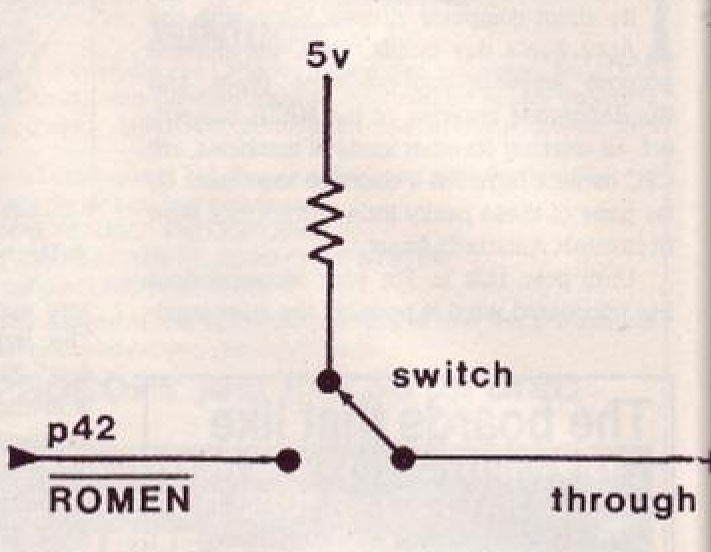
Bits

ROMs reserve their memory on power up or reset and simply switching them off does not release the memory. A reset must also be performed.

Similarly, switching them on doesn't cause them to grab what memory they need. Again it must be a reset after switching. Any ROMs that are closer to the computer than the switch will not be affected so, if you want to leave the silicon disk working, for instance, put the switch outside it.

All ROMs outside the switch will be affected and this includes the disk drive ROM in the 464's disc interface unit.

Sorry folks, it's not my fault they didn't put a through connector on it and it has to be the last one out! ●



● Figure 2: the circuit diagram

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FORUM

Gather ye tips while ye may – with PAT McDONALD

Welcome once again to *Forum*, where Pat does his level best to answer your questions and pass on your hot tips on *all* aspects of CPC use.

●Say cheese

This program can be used in conjunction with Phillip Butler's AMX screen format creator in *AA25*. If you want to convert a headerless file screen picture to a standard file then this little listing does it for you. The program runs the firmware routines in memory location &BCA1 which will load the headerless file. When the picture has been loaded insert a tape, press record and play then hit any key. The pictures will be saved as standard binary files.





● *AMX Mouse* – rodent still going strong!

```
1 'Headerless Screen file converter
2 ' By Troy Krajancic
3 ' Amstrad Action August 1989
10 CLS: INPUT "Mode";m
20 INPUT "Speed Write";s
30 IF s<0 OR s>1 THEN 20
40 FOR a=1 TO 15
50 MODE m
60 READ a$
70 POKE &2000+a,VAL("&"+a$)
80 NEXT a:CALL &2000
90 CALL &BB18
100 SPEED WRITE s:SAVE
"!picture",b,&C000,&4000
110 DATA 11,00,90
120 DATA 21,00,C0
130 DATA 11,00,40
140 DATA 3E,16,CD
150 DATA A1,BC,C9
```

Troy Krajancic, New Zealand

Excellent, Troy – here, have a tenner!

●*Amcharge* – now the truth can be told

You are confused about the *Amcharge* program at the end of *Wec Le Mans?* Here is your answer for you! The online service Minitel (it is French, something like your Prestel) offers users the chance to buy software over the telephone. You need a Minitel terminal, a cable, a CPC and the *Amcharg e* program.

You dial Minitel and enter 3615 AMSTRAD. From here you can get information, tips etc on the CPC, and also the chance to load up, play and if you like perhaps buy software. It is cheap too, I think: about £4 for *Arkanoid 2*, plus the online time.

Pascal Brocat, Southampton



● Minitel, one of the great European inventions

Thank you Pascal, and also the others who explained what the mysterious program was from Forum, AA46. For those who haven't heard of Minitel, it's a videotex system from Telecom France, and there are almost five million of them in homes and offices throughout that beautiful country.

It's a pity that we don't get Minitel over here, though what with the Channel tunnel, 1992 and all that we may not have to wait too much longer. Indeed, I understand that Kays International Teleservices (you know, Kays the home shopping catalogue people) has just been introduced to Belgium, and is now being offered, via Minitel, in France. It would appear that all the European advances are being made on the other side of the water.

Isn't it about time that we on this side grew up a bit?

●Foresight saga

I own a 464 which I use with a DDI-1 disk drive and printer. *Mini Office I* and *Easi-Amsword* have similar difficulties running with this setup, all I get is the following error messages:–

`Rewind the tape and try again: your computer has incorrect value of HIMEM` (Word processor)

`Drive A: Disk missing` (Spreadsheet)

Easi-Amsword loads OK, but on attempting to save a file to disk the program comes up with:–

`Fault in Line 990`

The programs work fine with the disk drive turned off, but I would prefer them to be disk compatible.

A.J. Kirk, Stevanage

It's a case of redundancy, I'm sorry to say. Those programs were written before disk drives were readily available, and due to lack of foresight they just won't work with a disk. Unfortunately such programs are still available today: so buyers beware! Of course, if there are any friendly people out there who know how to get said programs working, then let me know.

●Hard software problem

I want to sell some of my old software. I wrote to a firm called Crazy Joe's, who wrote back saying that due to some problems they had decided to stop dealing in secondhand software. Where can I sell it?

J Exell, Portsmouth

I'm not surprised that Crazy Joe's had problems – I certainly wouldn't like to sell 100,000 copies of Roland Goes Somewhere Completely Different.

A jolly good question, though, and by no means an easy one to answer...

When I sold some hardware to a computer shop for them to flog off as a secondhand



● Poor J. Exell of Portsmouth – up to his neck in old software which no-one seems willing to risk buying from him!

machine, they wouldn't touch my software collection. Apparently there is lots of confusion at present, because some software (mainly commercial business packages) are licensed to run on only one computer system. Nobody is terribly sure of the resale rights of software purchases.

It is to be hoped that the planned reforms of law on copyright make clear the situation on software and include this information. The big problem with secondhand software is that it's virtually worthless, due to the huge numbers of pirate copies available.

Given that that's the case, how about knocking up a few Brownie points by taking it down to your local Oxfam? They're running a big effort to sell software, and you know it's going to a good cause.

●No pleasing all the people

Your *Typewriter* checksum program seems to work very well, but I have one major moan to make about it: it's *too* accurate! If a line has an extra embedded space in it, then the checksum will be wrong. For instance:–

```
100 This line has an extra space  {ArBj}
100 This line has an extra space {IrBi}
```

The second line does not have an extra space, and the checksum is different! I don't want to sound too critical – it's a big help. But there are going to be lots of people driven mad trying to find out what they're typing wrong!

One more thing: can you please try and avoid using the character **1** in listings, and similar easily mistaken characters? It's very hard work for us old codgers.

AA Cooper, Lisburn

I take your point, but of course the purpose of Typewriter is to give people an indication of any typing errors. Listings don't have to be exactly the same as in the magazine to RUN. The idea is that if you get a dodgy line and the program doesn't work, then you'll know exactly where the problem is.

As for the mistaken characters, we do ask people not to use them. Unfortunately if they do then it's more than a little time consuming to change them all and then debug the program. I try only to include such programs if they have something special to offer.

●Advanced?

I have a 464 with a memory upgrade plus a DDI-1 disk drive. I also have an external ROM board with the 6128 ROM fitted. I have purchased the *Advanced Art Studio* from your Mail Order service. With the 6128 ROM fitted it loads OK but crashes after a few minutes, and without the ROM it crashes even sooner. I gradually get less and less into the program before it crashes, and eventually it can't get past the security screen.

A friend of mine checked the disk on her 6128 and found it to be fine. I've tried changing the position of my drive and using the keyboard instead of a joystick. Neither have any effect.

Do I have too many connections to the drive port (the ROM board, the disk drive and the



● *Advanced Art Studio* – **giving one user headaches**

memory upgrade)? Or does the program need to run under CPM+?

A Gilson, St Albans

It does sound to me as though you have too many connectors on the user port. You don't really need the ROM board connected, so I suggest that you disconnect it and try it then – the program doesn't need a 6128 ROM in order to work.

Failing that, there's probably a fault somewhere inside your CPC. To repair it try, for instance, VSE Technical Services on ☎01 737 0234.

●Wobbly turn off

My computer has developed two faults. When you press record and play together, the computer switches off – it sometimes does this while loading games. Also, the screen wobbles rather badly. I have fitted an anti-surge plug to try and cure these, but to no avail.

Can you tell me what's the best Centronics interface available for the CPCs? I want to connect mine to a Olympia Carrera typewriter.

Jonathan Stewart, Dundee

You most likely have a loose connection inside your computer if it's physically switching off. The wobble is probably just the horizontal or vertical hold being slightly wrong. But I suggest you talk to VSE (☎01 737 0234) anyway. (Incidentally, we mention VSE as repair specialists for the CPC because we hear good things about them. We welcome recommendations – and warnings! – about repair people you've come into contact with.)

As to your final question: your computer's already got a Centronics interface! It's on the back, labelled printer port. I'm assuming here that you want to use the typewriter exactly as you'd use a printer. What you want is a cable to connect it to the typewriter. I suggest you take the manuals for the two machines into an electronics shop, and ask them to build one.

Alternatively you can buy ready made up cables from places like Dixons or John Menzies. When it's built, either mask off or cut pin 14, to prevent extra line feeds chopping up your printing.

●(Not) labour saving – update

Thanks for publishing my problem in *AA46* ("(Not) labour saving"). I think I've isolated some of the knottier points, which is why I'm writing this. Basically, *SuperCalc2* and *D R Graph* work quite well together except for the following points.

a) You can use **INITDIR** on your disks (both system and data files) without much trouble. Date-stamping may be needed on data files to keep track of a series of *D R Graph/SuperCalc2* for security reasons. But both of these were made in the heady days of CPM 2.2, and the *SuperCalc2* system data interchange (**SDI.COM**) cannot handle date-stamped files without the unpleasant possibility of corrupting them.

b) **PIP.COM** itself subtly corrupts filenames and filetypes (seen on the filetypes more readily than on the filename part of the directory label) shown by a disfigured letter.

▌Ample samples for DJ Bpm

I am at present trying to get started as a club DJ. I spend most of my time locked away in my room with my two turntables and mixer, mixing it up to the early hours of the morning (much to the annoyance of my neighbours).

I have longed to own a mixer with a built in sampler, but for one with a four second sample rate an £800 price tag comes free! Then I saw an advert in *AA46* for the *Ram Music Machine* by Datel Electronics.

Is this the answer to my dreams? Will the sampler allow:–

a) Sampling from a record via a mixer, and then playback using one of the Amstrad's buttons while the record is still playing?

b) Can the other facilities – echo chamber, drum machine and so on – be used without the use of a Midi keyboard?

c) Are there any other software packages that might be worth considering? Perhaps allowing a little longer sampling time?

I own a 464 plus colour monitor.

Bpm, Shepherds Bush

Well, it's all certainly possible with the Music Machine. Rather than sampling live, you'd have to prepare your samples earlier and load them in for each record – this would allow you to get the quality up to its best. Even the best isn't great though: a filter to suppress the hiss on samples would be a sound idea.

As for other bits of software, the Micro Music Creator does virtually the same job, but contains no hardware. On tape it's available for £9.95 from First Byte Software (☎ 0225 765086: take a look at the advert they've been running).

Best of luck experimenting, and let us know how it goes.

This is what happened in my case – and *DR Graph* refused the `SDI.COM` imported data as a result.

Therefore, the only answer with a) is to simply not date-stamp any of the *DR Graph/SuperCalc2* files at all, or at least use separate date-stamped disks if it's imperative to have security backups.

The snag is, you are only allowed to make three copies from your *SuperCalc2* disk, using the command `SUBMIT MAKE6128`, and don't `PIP` the disk contents over to another disk. (No, I didn't `PIP` the *SuperCalc2* data in quite that way, but it's surprising how many people do!). After that, you're on your own.

With regard to b) if `PIP.COM` itself is corrupting data/system files, then the only answer (you'll love this...) is to remove all `PIP.COM` and suspect files from disks after inspection.

Then replace them with good copies taken from the CPM+ master disk. The problems are then – hopefully – cured. Unless, of course, your readers know otherwise...

James Haswell, Camberley

Thanks Mr Haswell. Well, at least you got it sorted – eventually! Why is doing something relatively simple but slightly non-standard in computing always so dashed complicated?

●Cut'n'paste



Before I started writing in machine code, when I tried to copy a screen and save it in another part of the memory for later redisplay, the routine took about 25 seconds. This was because I kept on poking the values of the inks pixel by pixel.

Below is the machine code effort. It sets up two RSX's: `|COPY` and `|PLACE`.

```
10 REM Copy and Restore Screen
20 REM By Andrew Price
25 REM Amstrad Action August 1989
30 PRINT "|COPY TO COPY SCREEN"
40 PRINT "|PLACE TO POP IT BACK UP"
50 FOR addr=&BE00 to &BE31
60 READ pok$:pok=VAL("&"+POK$)
70 POKE addr,pok:NEXT
80 CALL &BE00
90 REM Machine Code Data
100 DATA 00,01,0B,BE,21
110 DATA 13,BE,CD,D1,BC
120 DATA C9,17,BE,C3,21
130 DATA BE,C3,29,BE,00
140 DATA 00,00,00,43,4F
150 DATA 50,D9,50,4C,41
160 DATA 43,C5,00,00,3E
170 DATA 40,CD,06,BC,00
180 DATA C9,CD,14,BC,3E
190 DATA C0,CD,06,BC,C9
```

Andrew Price, Dunstable

Thank you for that, Andrew. I'm sure many readers will find it useful.

●Nearly Last Question?

I have just recently purchased an Amstrad 6128, and am really interested in getting a printer for it. I noticed that in the March edition of *AA* that you compared two printers. One thing puzzles me: what does NLQ mean? Also, what word processor and combined database would you recommend?

Ian McCallum, Saltgate



● **Yes yes, I *know* it's a printer – but what does "NLQ" stand for?**

NLQ stands for Near Letter Quality – that is, the best type that the printer can produce, suitable for correspondence. As for printers, word processors and so on, have a good read of the Buyers Guide *on page 75.*

●Bug squasher

Help is at hand for RJ Stevens (*Forum, AA*45)! He says that there's a bug in the printer dump for CRL's *Image System*: Indeed there is but it can be easily rectified.

If `PDUMP` has been loaded into memory using `LOAD`, then `LIST` the program. The problem is on line 60. It needs to be edited so that it only consists of data as follows:

```
60 DATA 1,2,3,4,5,6,7,8,9,10,12,13,14,15
```

Then enter the following lines.

```
61 DIM k%(15)
62 DIM tone%(16,4)
63 RESTORE 50
```

Then save the modified progam and it should work. When the program is run, you enter the required filename and the required picture is loaded onto the screen.

If the colours are completely different from what you expected, don't panic. The end result is not affected: it takes about 20 minutes.

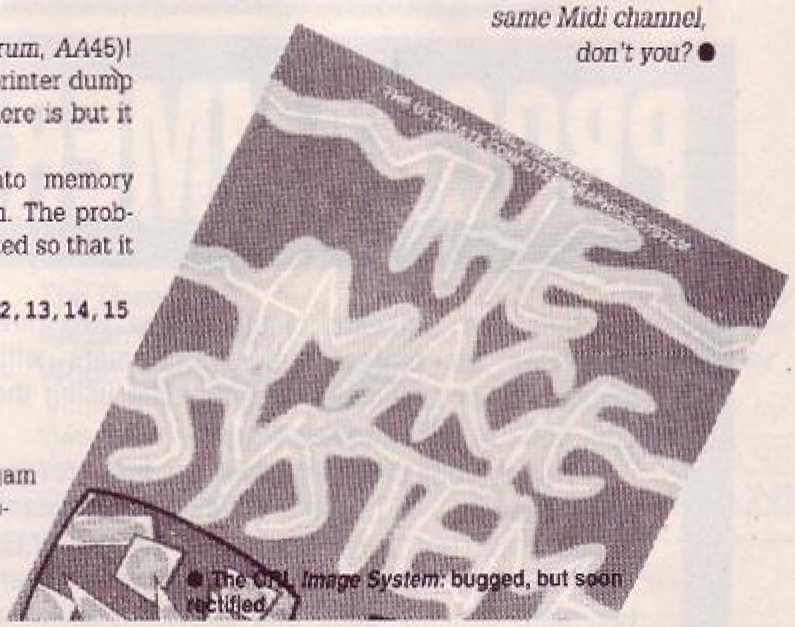
Anyone wanting more information on the *Image System* should write to: CRL Group PLC, CRL House, 9 Kings Yard, Carpenters Road, London E15 2HD.

Now for a question of my own. Is the *RAM Music Machine* Midi compatible with the Yamaha DD-10 drum machine? I have followed instructions for both the *Music Machine* and DD-10 but I still can't get any joy.

S.D. Green, Woking

Thanks for the solution to the printer problem. Can any valiant reader tell the truth about the Midi connection?

I've got most things working together – including a Yamaha drum machine. You do have the interface and DD-10 talking on the same Midi channel, don't you? ●



● **The CRL *Image System*: bugged, but soon rectified**

●Quick filler

If you own a 664 or 6128, and want to use the fast `FILL` command of Amsdos in the *Smart 2* art program, type in the following few commands:-

```
LOAD "SMRTPROG"
1180 FILL pe
DELETE 1190-1260
SAVE "SMRTPROG"
```

Torben Jensen, Denmark

Nice one Torben – a real time saver!

£40 if you honour our offer!

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Guns: cool?

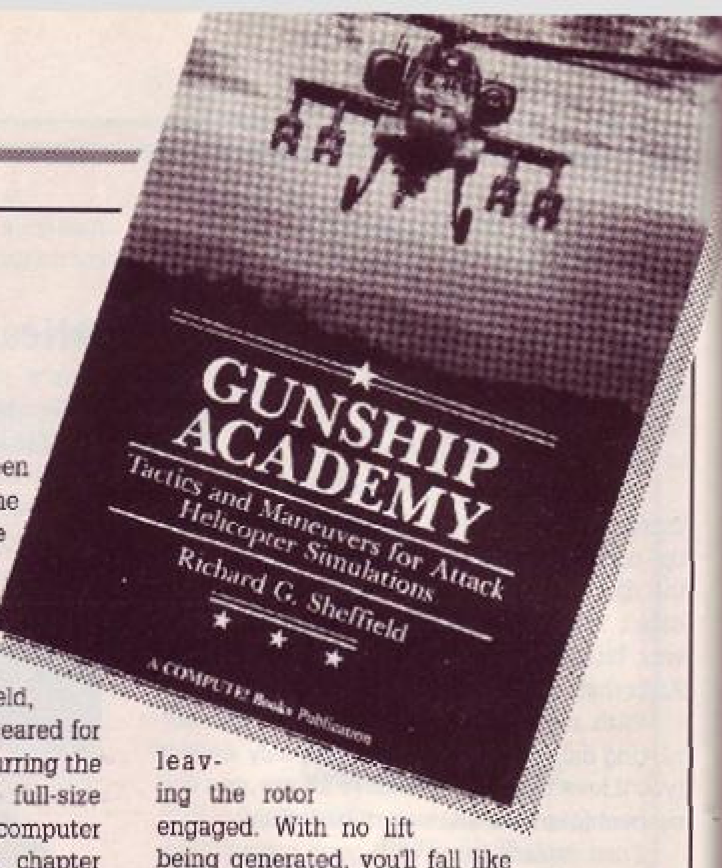
Microprose's *Gunship* is one heck of a simulation *(AA*40, 82%). But there's much more to it than flying about in an Apache attack helicopter, as STEVE CAREY discovers...

Playing *Gunship* is like watching boxing: pleasure is compromised by guilt. After all, it's only a computer simulation, and no-one suffers. But then, the AH-64A would never have been developed in a truly peaceful world. And as Pat pointed out when he reviewed it back in October, the ghost of Vietnam wanders through this training in violence, despite its total absence from the manual (and indeed from the book).

There is an introductory chapter in jerky, American journalese on the development and design of the AH-64A Apache, the result of a dogfight between Bell and Hughes (as in Howard, legendary nutcase). On September 30, 1975 the Hughes YAH-64 flew for the first time; the Bell YAH-63 made its maiden flight the following day. By December the army had chosen the Hughes design, and there only remained the squabbling between Jimmy Carter and Congress over the extent of funding for the next stage of development, eventually settled at $165 million. In April 1982 approval was given for full-scale production.

So much for historical fact. Sheffield, having set up the machine, is now cleared for flight. And fly he does, constantly blurring the distinction between a real-life, full-size weapon of war and its simulated computer counterpart. His introduction to a chapter devoted to 'Ten Rules to Live By,' for instance, begins with a disconcerting account of the posthumous award of a Distinguished Service Cross to one Warrant Officer Buzzsaw 'for extraordinary heroism in connection with military operations involving an armed Soviet force near the East German border.' Huh? Relax, it's only Sheffield exercising his fertile martial imagination. Still, the rules themselves – 'Avoid Target Area Overflight,' 'Always Positively Identify Targets Before Attack' – should get you through.

Finally, here's a heartstopping sample tip from Sheffield on losing altitude quickly to avoid enemy fire: 'Shut down both engines, leaving the rotor engaged. With no lift being generated, you'll fall like a stone. Once you pass through 150 feet, start the engines again, and you should bottom out at about 80 feet.' I tell you, there are times when you're playing *Gunship* you are *glad* it's only a simulation!



It doesn't occur to Sheffield that there might be an argument about the ethics of *Gunship*. But then, it's only a game, isn't it? ●

Gunship Academy: Tips and Maneuvers for Attack Helicopter Simulations, by Richard G. Sheffield. Published by Compute! 1988; ISBN 0-87455-153-6. Available from Computer Manuals Ltd (☎ 021 706 6000) at £12.95.

THE LOOK

More fun in pixel land with PAT McDONALD (for it is he)

Last month, as no doubt you recall, we went over the operations of *Symbolizer*, Shabaz Yousaf's excellent *Type-In* for altering the inbuilt CPC character set.

Now let's take a look what sort of program is needed to store and print out character modules wherever you may need them, and also some of the principles behind game backgrounds.



• *Saboteur* – large playing area, but not a great deal of colour.

The first thing to remember about modules (which are collections of characters redefined to taste) is to avoid thinking of them in terms of grids. A better way is first to decide on a maximum width for the module. If you store the characters as one long list, the computer can quite happily chop out the correct widths and arrange them in vertical order.

The CPC is happier keeping track of one list of data with a width at the beginning than trying to remember grids. One further pitfall of using grids is that you must specify the length along both axes, therefore using up – slightly – more memory.

It's worth going over some of the fundamental mathematics of printing characters. If each character is in the normal range of 0-255, and if no module is wider than 255 characters then 10K of memory can hold up to 21 mode 0 screens (albeit in two colours only) or approximately 5 mode 2 screens.

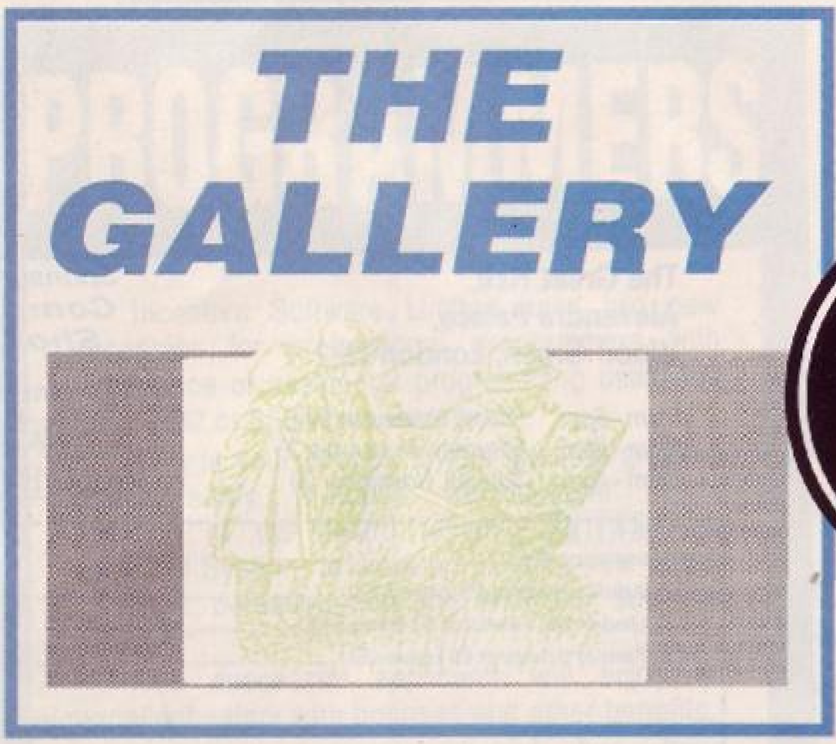
Think of it like this: a mode 0 screen measures just 20 X 25 characters, or 500 bytes worth of data. A mode 2 screen is 80 X 25 characters, or 2000 bytes of information.

Memory munching

Two colours isn't really a lot for mode 0, though – after all, it does have 16. How can this be remedied? The best way is to create each individual object that you're making out of several different coloured modules. The amount of information needed to store the colour of each module is one byte (a choice of 16 colours for foreground, 16 for background = 16 X 16 = 256).

Alternatively you could store a colour indicator for each individual character used in a module. The problem with this approach is that each module is twice as big as it should be, because the extra colour information takes up exactly the same size as the module data. And that's why I advocate the first approach, as used in games like *Saboteur* and *Thanatos*.

One more possibility that doesn't make too great a demand on memory is to use one more

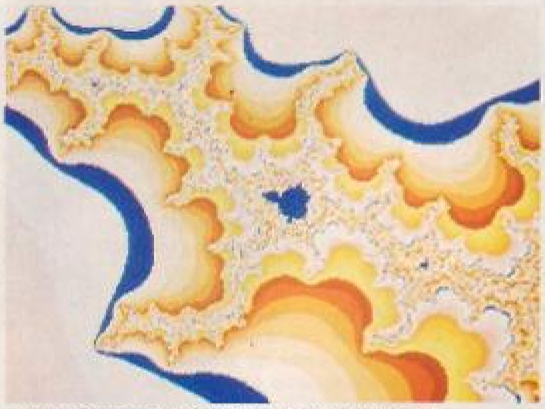


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• Simon [illegible] knows how to use Smart 2

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Pat McDonald's *The Look*
Amstrad Action
Future Publishing
4 Queen St
Bath BA1 1EJ



● The immensely irrational Mandelbrot set

byte at the beginning of module data for printing effects. That is, if the first bit of the effect byte is set, it would indicate to the printing program to switch to XOR, AND or similar effects. You can then overlay modules on top of one another, creating diverse different onscreen variations.

This overcomes one of the handicaps of character modules – screens tend to look very similar to each other, which in some games is tolerable and sometimes not.

Background theory

There are three different ways to store the data for a program's background screens. The first is simply to store it, in unmodified form, as a series of 20 X 25 'rooms.' As a rule (as mentioned above) around 20 or so screens can be stored by using this method, which is why games like *Manic Miner* had only 20 screens.

The second way is more complex, and is also mentioned above. By storing the onscreen co-ordinates of various modules, and changing the colours/printing arrangements, an area perhaps 50 or more times as large as the screen is possible (by incorporating scrolling routines into the game, a player can move the screen window over the whole playing area). ●

● Next month in *The Look* we examine 'Chaos' programming in more depth. *Plus* the *AA* Module Designer. Miss it at your peril!

Elementary

It wouldn't take a Sherlock Holmes to deduce that the *AA* Sprites animation routines have so far singularly failed to put in an appearance. The reason? Elementary my dear Whatsize: their bigness (and don't believe anyone who says size doesn't matter). It has been estimated that they'd take up approximately, er, loads of pages if we just printed them.

So we're going one better. Look out for them *on the next cover tape – coming soon!* – and save yourself hours and hours *and hours* of laborious typing...

It's utter chaos round here, it really is...

The third modus operandi places more of a strain on the programmer than the other methods, but is superior in terms of storage areas.

Rather than storing simple co-ordinates of where modules should go, equations are written to 'decide' where all the different modules should go. The processor takes all of these equations and applies them to the screen area, 'placing' the graphics.

This is a 'random' area designer, and so is most suitable for games where the playing area is a jungle or a wilderness. Alien enviroments are also good vehicles for this method, as they're supposed to look wacky.

Sounds complicated? There's a good reason for that. The main advantage of using 'Chaos' programming to position blocks of characters is that it can incorporate an area as big or as small as you want. Two byte co-ordinates per object gives 65536 X 65536 area in character terms – or over 4 million screens!

Just try and imagine the playing areas if four or five bytes per co-ordinate per module type. By incorporating equations to cover different climates, it is theoretically possible to model an entire planet inside a CPC!

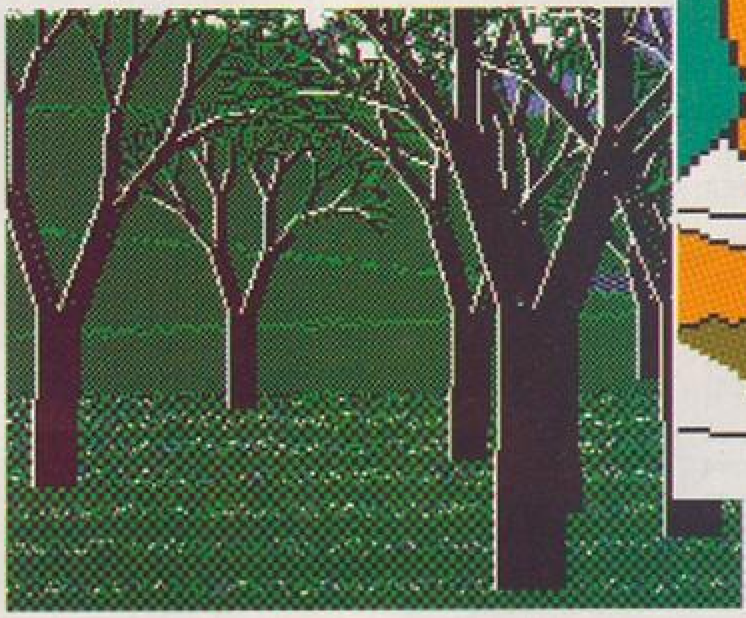


● This is another from Simon – the art package was actually a *Type-in* in *AA16*

● Queenie, right, by M.S. Browning of Blackpool, uses CRL's *Image System*. Nice one, your Majesty!



● Aubrey Berwick of Liss sent a whole disk full of pictures drawn with *Advanced Art Studio*. Left: his winning entry. Below: his perspective landscape. £20 is on its way, Mr B!





● James Davidson from Glasgow has been featured before. But no more Garfields, OK? Even if you do write your own art programs

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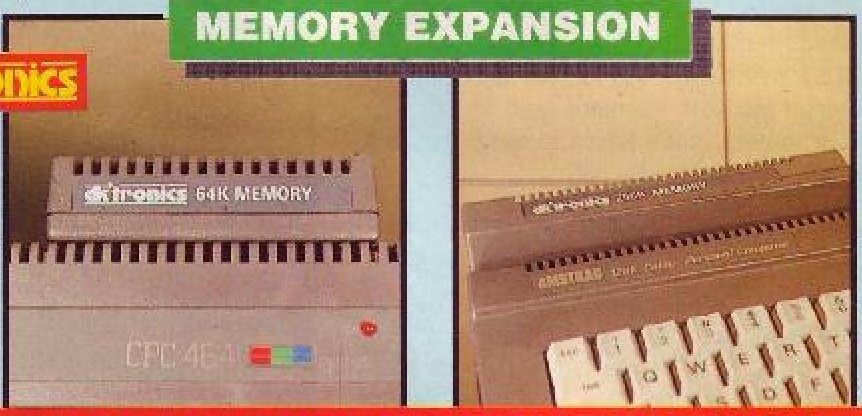
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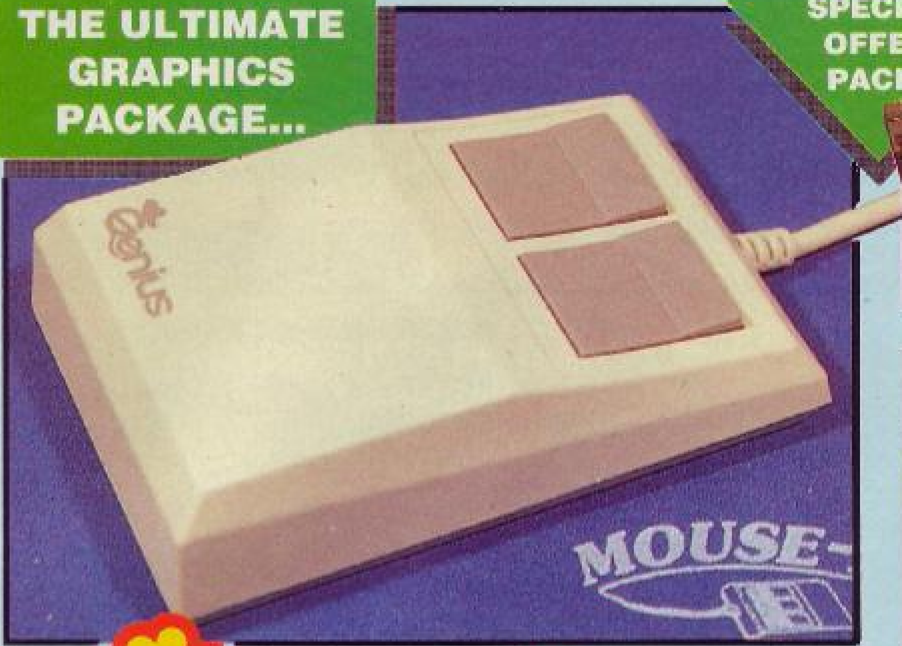


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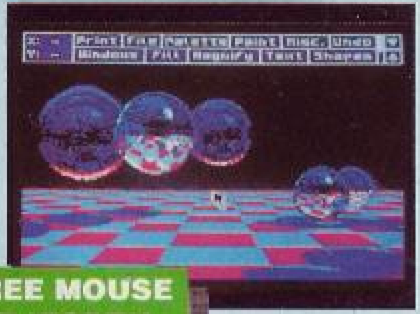
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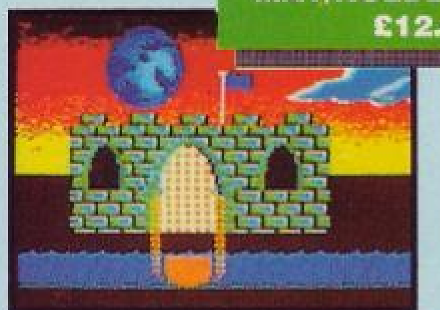
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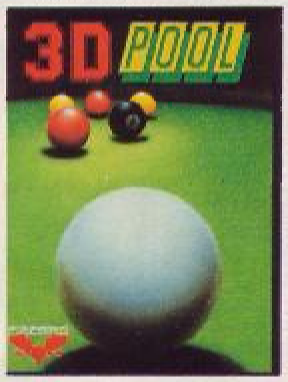
It's TRENTON WEBB time again, folks!

This month's centre spread, traditionally the preserve of the *Mastergame*, is occupied instead by the Virgin/Mastertronic *Magnum* lightgun: will it transform games playing on the CPC?

Meanwhile it's a busy time on the reviews front, with *Timescanner, Silkworm, Xybots, Skate or Die* and *3D Pool* all clamouring for your attention. Star of the issue, though, is Grandslam's *Thunderbirds* – quite possibly the year's best value. Two quid tape/disk differential? Like it!

3D POOL

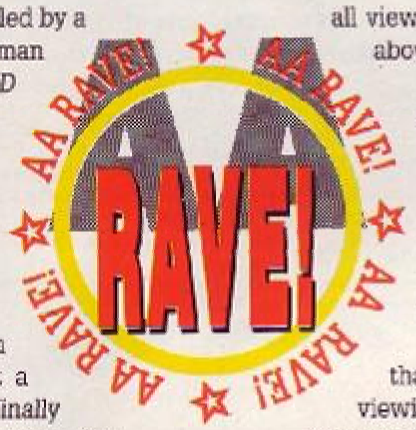
Firebird ● £9.95 cass, £14.95 disk joystick/keys



It has been observed many times that pool, snooker and billiards could be played efficiently by an idiot equipped with a book on ballistics.

This can't be quite true – as I recall, the book never helped me one single bit. Yet there's a good case for thinking that computers, with their totally logical and accurate calculating processors, could really get into pool in a big way.

I can't see it myself. Can you imagine walking into a pool hall to be hustled by a plastic'n'steel Paul Newman android? Still, looking at *3D Pool* you could believe that one day machines will rule the green baize. And when you consider that an android has been world snooker champ more often than anyone else...

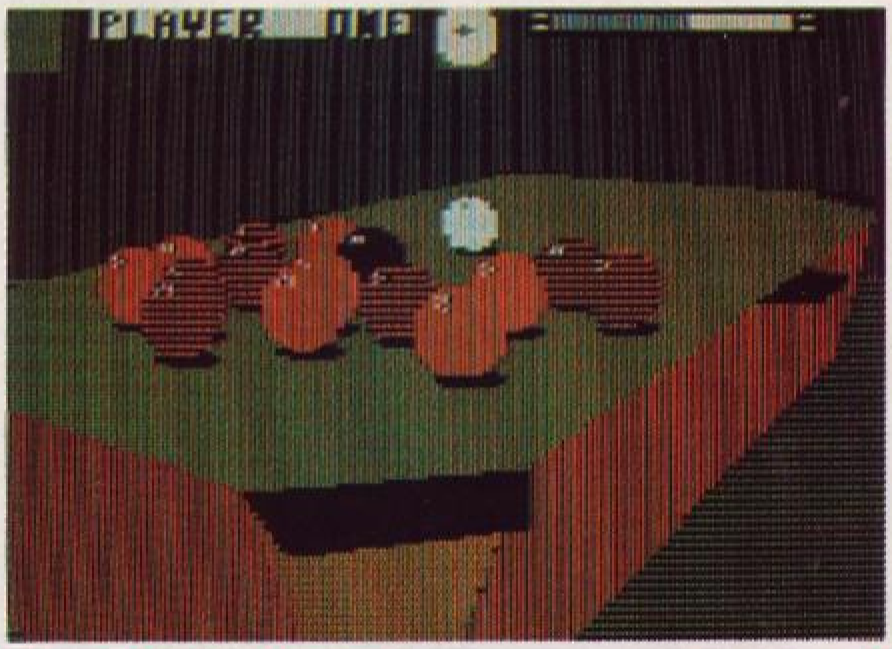


Firebird's *3D Pool* – in which you compete against a variety of opponents, and finally European Pool Champion Maltese Joe himself – is just the latest in a whole series of snooker-style games that have been appearing since they become popular in the arcades around 1984. They include such classics as robotics expert *Steve Davis' Snooker* and *CDS Pool*, but they have all suffered from a shortcoming – they were all viewed from the same vantage point above the table.

As the whole table had to be viewed at once, the scale of the table wasn't very big and the games become predictable. It wasn't that you could always pot the balls, but you could nearly always say that you'd miss and by what margin.

The advantage of *3D Pool* is that you can walk around the table, viewing the cue ball from every angle.

You can also strike at the bottom or top of the ball, in order to induce spin. That's not so new, but when you do so, the table tilts to show you the exact angle that you're aiming at.

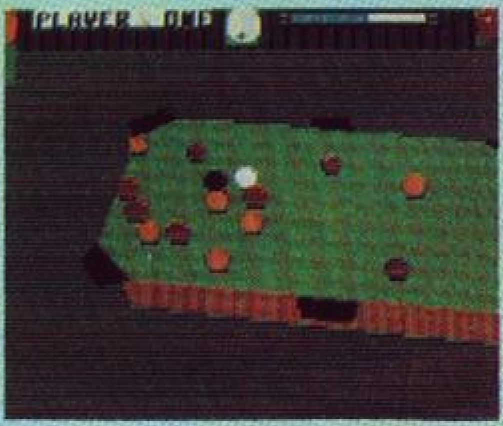


● Got to take the white off two pockets

Game for a break

The game offers a wide variety of options for serious addicts. There is the practice feature, which lets you get on with the serious job of potting balls. Then again you might want to try some trick shots. These are very difficult to get right, but make for some great practice – taking the same trick shot with even a slight difference causes a wide range of variation in how the table finally looks.

The tournament itself is fairly easy to understand: it starts out with eight players; who produce four winners; who produce two winners; who produce one overall winner; who then takes on Maltese Joe (and loses). My own personal feeling on Maltese Joe's ability is that the reason you always start first is because he's so good – you can only beat him if you start first and have a perfect, white-washing break.



● Even 'Fast Eddie' would struggle on this one



● A ball that just refuses to go down



● Make or break

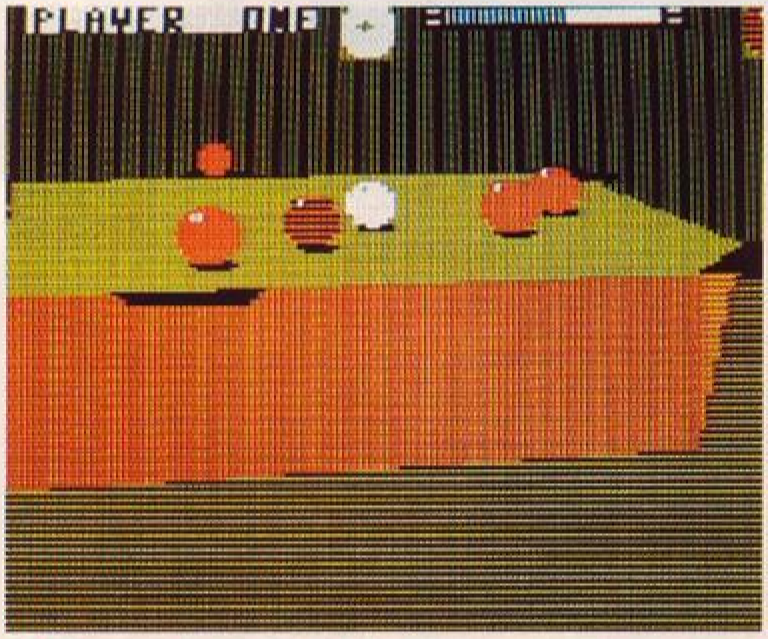
The great Orlando

On the starting screen of 3D Pool notice the name of the designer, Orlando of Aardvark Software, a legend in his own lunchtime. Orlando has been writing games since at least 1983 (yup, before the CPC was invented) and has won awards for game design and innovation.

It's quite remarkable that such a big name should reappear on what is basically a strategy-with-action game. One of his earlier classics was called *Frak*, and although detailed to be converted to the Amstrad it never, as far as I know, made it.

That game involved a caveman who had to travel across a series of platforms *(oh wow -ed)* knocking off monsters called scrubblies with a hand held yo-yo *(pardon? -ed)*. One supple flick of the wrist and another brightly coloured hairy nasty was sent screaming down the screen.

It remains to be seen if more games are released by Orlando, and if his current style is set rigidly. If it is, it won't be a bad thing. Except for those who love caveman simulators!



● The computer gets lost in thought

All the balls are shaded, as is the table and background. The big let down is that, although the screen is in the chunky 16 colour display mode, only 4 are actually used! Considering the way the game appears on screen (in fact it's pretty good) it could have been amazingly good. Another lost opportunity...

SECOND OPINION

"Agonisingly slow, agonisingly difficult, and still a game to return to time after time."

TW

GREEN SCREEN
no easier – but no hassle

One final point about the display: the speed at which it rotates and moves is so fast you can dip and spin enough to make you seasick. But when the computer is thinking about its shot the action is frozen.

The game theory is easy enough. You have to line up the white ball to make a fair shot. The white always travels vertically up the table away from the viewpoint. This means it is easy enough to judge angles when the cue ball and object ball are close, but much trickier when they're touching or fairly distant.

Progression in the game is much as by the rules. The game is based around a tournament, with various computer controlled opponents. These range from No Hope Nik to Mighty Mike, and they've all got their own individual styles.

There are a few differences from the real game. The human always breaks in the first and last frame, with the computer taking the middle one. When a foul stroke occurs, a free ball is automatically awarded to the other player. Most disturbing of all is that there are no cushions, the balls simply bouncing back from the edge of the table.

All of the computer opponents play extremely well. It's very disheartening to lose game after game, especially to the same player. I must have lost about fifty games to Mighty Mike alone! You soon understand though, that although the different players have different styles, the only real change between them is that if you play an easy player, *the pockets are larger!*

You start playing, and you just can't stop. Eventually things can get serious, with a demented gamester demanding the right to play various players, and taking several hours to lose frames that should take a few minutes.

My only objection to this hugely addictive game is its difficulty. It's not as devious a game as the real thing, but compared to your average shoot-em-up there is no comparison. Give me lots of *3D Pool*, and I'll be happy. **PbM**

First day target score
win a match – *any* match!

The Verdict

GRAPHICS 74%
- ☐ Very good moving 3D graphics.
- ■ But mode 1 would offer better resolution.

SONICS 8%
- ☐ Two good sound effects.
- ■ That's all.

GRAB FACTOR 90%
- ☐ Fabulously addictive.
- ■ I'm still not cured.

STAYING POWER ...69%
- ☐ You can become skillful.
- ■ But it takes a long time.

AA RATING 80%

- ☐ Definitely worth cueing for!

TRIGGER HAPPY?



Is this the most powerful lightgun in the world? We put the Virgin/Mastertronic £34.95 Magnum to the test

At last we've got our grubby (but nonetheless exclusive) little pinkies on the brand new CPC lightgun from Virgin/Mastertronic, due in the shops any moment now.

It's been a long time coming, but the question is: has it been worth the wait?

The black vacuum formed plastic gun – appropriately enough a lightweight at less than half a pound – is a mere foot long (300cms in new money) and comes with 48" of wire. This may sound ungenerous, but of course since you plug into your keyboard you can sit as far away from your monitor as that will allow – though to be frank the practical maximum firing distance is no more than a yard. (Apologies to all readers not brought up on Imperial measures: ask the nearest parent or teacher, or failing that try a friendly adult.) It's fair to say that the *Magnum* does not give an impression of durability, though that's as true of the majority of joysticks also.

The edge connector plugs into the external port of your keyboard. And then you load up. It's as simple as that: there is no separate controlling software needed, and no technical knowledge is required.

What is required, however, is software to run it on. As you'll appreciate you can't simply start firing at your old copy of *Operation Wolf* or whatever and expect it to make any difference. That's why you can't buy the gun on its own. The six games bundled with it are *Missile Ground Zero, Rookie, Solar Invasion, Robot Attack, Bullseye* and *Operation Wolf* (see the box "The score so far: 5 – 1" on the right).

Electric gimmickry

What's the difference between the *Magnum* and a joystick? What are its advantages? How does it work? Well, for one thing the lightgun can be pointed at any point on the screen all the time. Moving a joystick means that the aiming point, the "point of animation," has to move through the intervening points.



● No cursor, but the Magnum's just as lethal

Under the flimsy casing of the *Magnum* there's a fair bit of electronic gimmickry. At the front is a lens which focuses the light for the gun onto a light cell. The signal is 'cleaned' somewhat and sent down to the CPC edge connector (there is no through connector: 464 owners won't be able to use disk lightgun software).

Similar hardware connects the trigger (actually a switch) to the computer. The trigger is a letdown: it needs to be repeatedly pulled in order to give a continuous stream of fire. It can't have been that difficult to fit an autofire button, can it? (Expect to see an *A A* hardware project for the lightgun before too long – is that myserious enough, Steve? *I think so, Pat – I certainly don't understand it – ed.)*

Stand and deliver

The message to the software houses who had pledged their support for the Magnum light gun must be: stand and deliver! The gun, no matter how technically superb it may be, is worse than useless if there are no decent opportunities to snatch it out of your shoulder holster and get popping things.

Only *Bullseye* and *Op Wolf* manage to steer clear of the trap so common to new games hardware. And *Bullseye* is a dreadfully tame version of the dull Jim "Magic magic fine great super" Bowen quiz-game-with-darts.

It's abundantly clear that the function of these games is purely and simply to justify the existence of the Magnum rather than to exploit its strengths. With the honorable exception of you-know-what all they do is prove that your £35 was spent on something that actually works.

The purpose of the lightgun should be to enhance a game concept and not be one. Instead of games being adapted merely because they can take advantage of the technology, programmers should be aware of its existence and use it accordingly. Instead of, 'Hey, this clapped out old dog of a game could get a new lease of life if we adapt it for the lightgun,' software project managers must take the line that, 'Wow! We've got a brilliant concept for a game here. And it will be even better if we can take advantage of what the lightgun can do!"

Credit where credit is due

The credit for bringing the lightgun into the world should go not to Amstrad, under whose name the Magnum is being sold, nor even to Virgin/Mastertronic, who are marketing it, but to Trojan Developments, who designed, built and manufacture the thing.

Swansea-based Trojan developed the lightgun for various machines – one each for the Commodore 64, the Amiga and the Atari and three for the various Spectrums. (Incidentally, there are two Magnums for the CPCs – one for the 464 and one for the 6128.)

They then interested Amstrad in badging the 'gun and Virgin/Mastertronic in marketing it.

As far as the software is concerned, Trojan licences the software driver out to whichever houses are interested, who then write it into any games they choose pay a royalty for using it. And it's only the work of a couple of days to convert a game to be compatible with the Magnum.

The score so far: 5 – 1

There are six games bundled with the Magnum: *Missile Ground Zero, Rookie, Solar Invasion, Robot Attack, Bullseye* and *Operation Wolf*.

- *Robot Attack* is just a matter of shooting small droids as they attempt to build a larger and more deadly parent. Here the gun performs as little more than a cork-firing airgun at the local fete, the robots becoming the plastic ducks everybody loves to waste. Fun for a few minutes, but hardly the technological breakthrough we've been waiting for.
- *Solar Invasion* fits the bill as the standard asteroids game with every form of alien life floating briskly across the screen and into your gun sights. Again it is little more than a tame demonstration of the lightgun's function and falls well short of the required mark to be called a game.
- *Rookie* is a straight out riflerange simulator with authentic sounds and small plate targets you blast to qualify for the next round of target practice. *Missile Ground Zero* takes you to one of those ever so familiar 'last surviving bases' where you save the world by shooting anything that threatens the base.



In all four games your supply of ammunition is limited in an attempt to stop you just going crazy and peppering the screen.

The remaining two games are the only one to have seen the light (pardon the pun) of day before.

- The dreadful Bowen-inspired (if that the word, which it ain't) *Bullseye* deserves to have been allowed rest in peace *(AA7*, 34%), and its resurrection is hardly welcome.
- That leaves just one game: *Operation Wolf*, without doubt the star of the collection. A superb game, it scored an extremely healthy 89% *(AA40*; Mike Wong poked it in *AA43*). If you have played it – in the arcades or at home – you'll know exactly why it's been attracting all the attention. It's a very fast-moving horizontally scrolling all-action, do-or-die (usually the latter) shooting game with thousands of soldiers doing their best to prevent you rescuing the hostages. Helicopters, patrol boats, machine guns, grenades and turkeys – this one's got everything!

Op Wolf provoked a resurgence in the age-old debate about violence in computer games, and may even ultimately be responsible for the notorious correspondence in *A A* featuring one Mr Wm A.A. Smith of Windsor.

It's a brilliant conversion in 'cursor' mode with the potential to become the first CPC 'authentic arcade' game – complete right down to the sore trigger finger! And its in a completely different league from the other dreadful old makeweights in the collection. For a start, of course, it helps to have a superb game to begin with.

But more than that, the lightgun brings back to the CPC version something that the arcade game had all along. There is, after all, something artificial about a joystick as a gun, since its origins are obviously as a steering device.

Now, with the Magnum, you feel that *O p Wolf* has come home. It was always an addictive, just-one-more-go game: now it's an addicitve, just-one-more-go game that *feels* right. The only problem is that impacts aren't registered, so when you're missing you don't exactly know whether you're shooting left, right, high or low.

Suffice to say, however, that *Op Wolf* was up and loaded within 30 seconds of its arrival, after which the silence in the office was broken only by the pinging of the game.

Is it or isn't it?

Op Wolf apart, though, will the light gun make enough difference to warrant forking out £35 for a couple of hundred grams of plastic and wires?

The gun offers a variety of gameplay additions to the state of play in current CPC software.

It moves as fast as you do and does not rely on microswitches to tell it where the shot has landed, so the rate of fire is improved, as is the number of different directions you may shoot in the same brief moment.

The sense of involvement is greater because (despite the complex moral argument, neither side of which is completely convincing) it *is* fun to actually hold a gun and shoot your CPC.



● Too many - and I'm dead again!

Most importantly though it gives writers of software the opportunity to use any of three methods of control – joystick, keys or lightgun – for the best and most exciting games.

It is conceivable that a combination of two could operate simultaneously. What about all three together for seriously heavy gameplay such as that in *Gunship?*

The future of the lightgun depends solely on programmers finding innovative ways of implementing its use. *Operation Wolf* clones won't keep the anyone happy forever. Good shoot'em ups need not only fast paced action but a little more control of their fate.

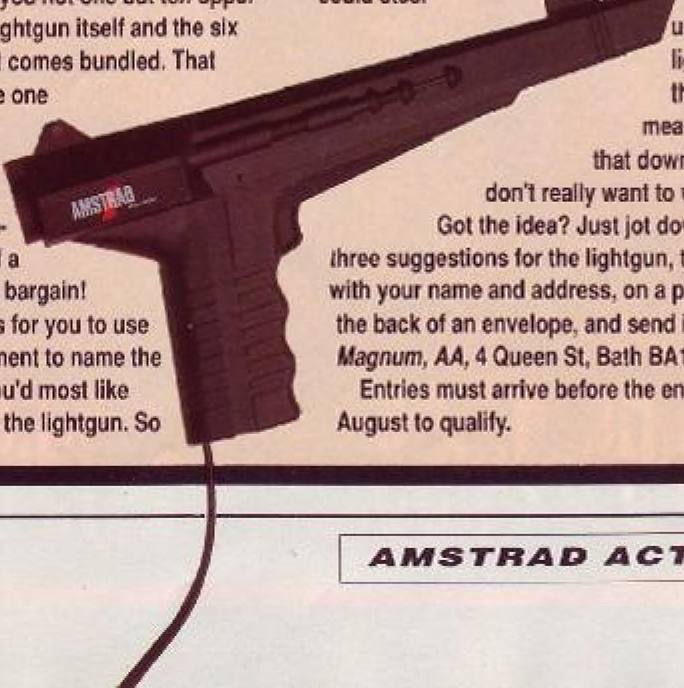
The Magnum may be used, say, in connection with a joystick to remove the static nature it so readily suggests. If this is the case then gaming on the CPC may never be quite the same again. If it isn't... we may yet be left with the world's most expensive item for stirring tea.

It will require a considered and concerted effort on the part of those in software houses to make use full of it. From their point of view it is an ideal opportunity once again to flog off software (modified to suit the Magnum) long since left for dead.

That's exactly what's happened with *Bullseye*. This new device requires long term support from software houses if it is to be more than a temporary toy. ●

Shoot into a new dimension– for free!

To celebrate the arrival of the Magnum, *Amstrad Action* and Virgin/Mastertronic are combining to bring you not one but ten opportunities to win the lightgun itself and the six games with which it comes bundled. That means you could be one of the first to experience this new way of playing games – not to mention saving yourself a neat £34.95 into the bargain!



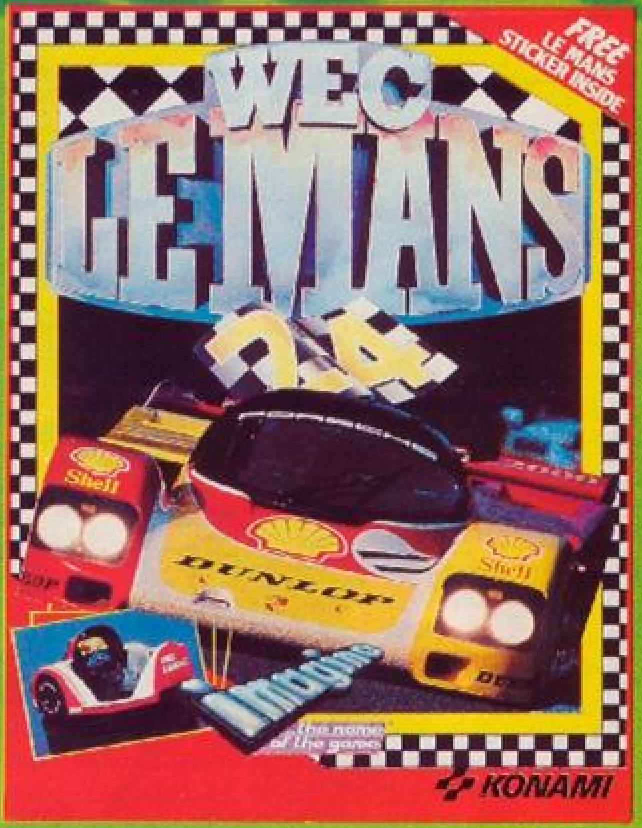
What we want is for you to use your skill and judgment to name the three games that you'd most like adapted to run with the lightgun. So if, for example, you honestly imagine that *WEC Le Mans* would be even better if you could steer using the lightgun, then by all means put that down if you don't really want to win.

Got the idea? Just jot down your three suggestions for the lightgun, together with your name and address, on a postcard or the back of an envelope, and send it to: *Magnum, AA*, 4 Queen St, Bath BA1 1EJ.

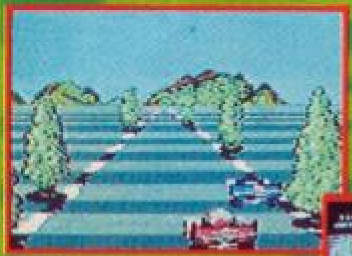
Entries must arrive before the end of August to qualify.

PLAYFUL





WEC LE MANS
"Wec Le Mans has many things going for it… I reckon it will be the definitive racing conversion for 8-bit machines."
Wec Le Mans is not a game – it is the ultimate driving experience.

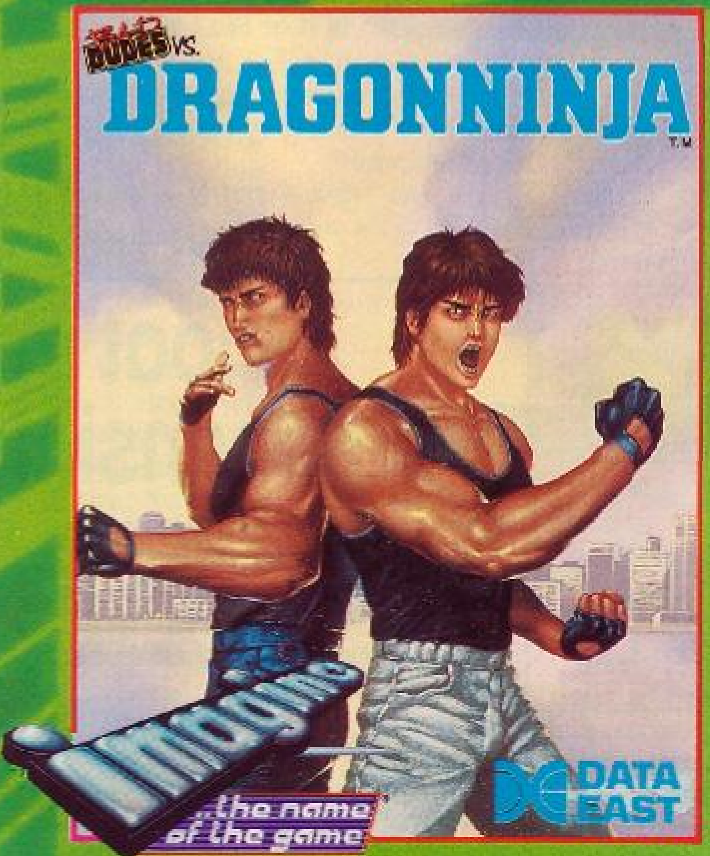




ROB
"This is defini
tie-in to date.
superb game
don't
C+VG GAME
COMPUTER



BAD DUDES VS DRAGON NINJA
"A sure winner with the official conversion to the home computer."
COMPUTER GAMESWEEK
"A very enjoyable and addictive game… The best conversion I have seen on the Amstrad."
AMSTRAD ACTION
"There is more than enough action in this one to keep you coming back for more."
ACE







	ATARI ST	AMIGA
BATMAN OPERATION WOLF	19·95	24·95
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INTELLIGENCE

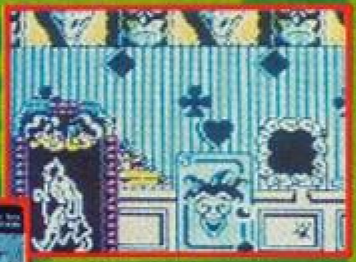
OP
the best film
is an utterly
ts own right-
s it."
THE MONTH
DEO GAMES



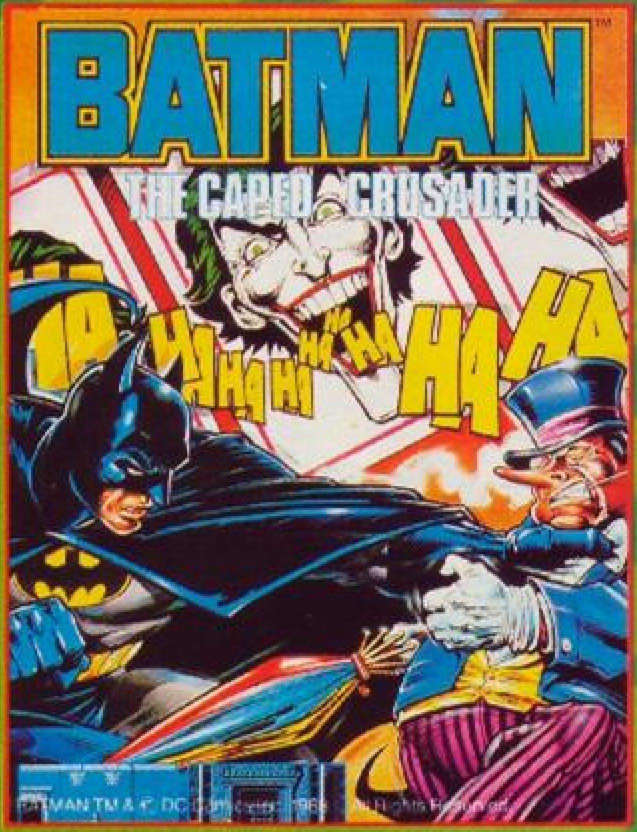
BATMAN
"Incredible presentation... Just the right way to capture the comic book feel."
ZZAP SIZZLER ZZAP 64

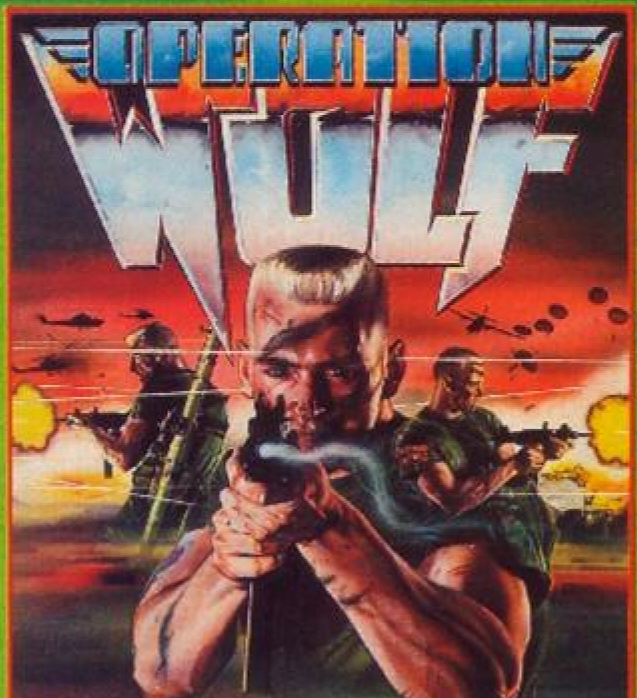
"Batman The Caped Crusader will suit riddlers of all ages."
ACU STAR GAME AMSTRAD COMPUTER USER

"Ocean have made a fantastic job on Batman and being in two parts you get excellent value for money. Brilliant!"
A CRASH SMASH CRASH









OPERATION WOLF
Voted "Game of the year." The world's No.1 arcade game.
"Super-smooth scrolling and excellent graphics... Without doubt this is a first class shoot em up."
A CRASH SMASH CRASH

"Definitely the coin-op of the year... Buy Operation Wolf it's a brilliant conversion."
C+VG GAME OF THE MONTH COMPUTER + VIDEO GAMES



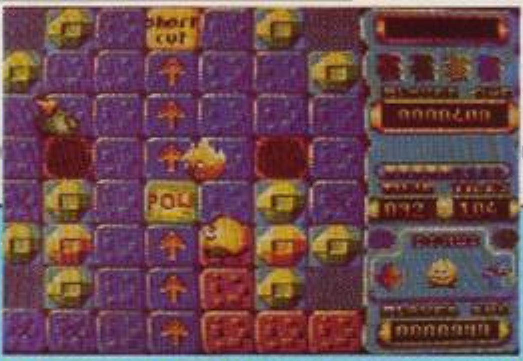
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SKWEEK

US Gold ● £9.99 cass, £14.99 disk joystick/keys



● Skweek when you're skwoken to!

Everybody's conservation minded these days, and now you too can do your bit by helping to save the lesser spotted, yellow crested, pink toed *Skweek* – or *Gamus Ratus Addicitivus* as they say in Latin (and remember, when in Rome do as the Romanians). *Skweek* is a creature who needs to reclaim his environment which has become polluted with horrible blue (boo!) tiles. They must all be painted pink if the little rodent is to be able to pursue life, liberty and the skweekian way.

To make tiles change colour all *Skweek* has to do is run over the top of them (where *does* he keep his paintbrush?). Naturally things are never straightforward, and our furry friend is pursued by a whole host of strange and curious beasties. Everybody, it seems, wants a piece of the yellow peril – ghosts, fireballs, purple people eaters, even gun-toting octopuses! Green star fish demolish walls to reveal blue tiles just to make life difficult, while the purple gang occasionally start laying new blue tiles to add to the challenge.

Skweek materialises (in a normal game) on a series of increasingly tough levels. The first one you visit, more of a warm up than anything else, has no tricks or traps apart from large holes in the floor. Don't let this lure you into a false sense of security, though: it's real dangerous out there for a young *Skweek* who's not used to the turf. Floors decay, manholes allow monsters to pop up and get you and self-destruct squares blow up all the tiles in the immediate area leaving *Skweek* stranded in mid-air making like Jerry the mouse scrambling for solid ground.



● Painting the town pink

On the plus side for serious *Skweekists* are a multitude of goodies to collect and keep: laser fire, turbo speed, baby skweek bonus lives, ice cream (!) and the Teds, the single greatest gift ever to the *Skweeklanders*. It's not that they've never grown up, nor that they need something to snuggle up with at night. But collect four teddy bears and you get five extra lives.

AA RAVE! AA RAVE! AA RAVE! AA RAVE! RAVE!

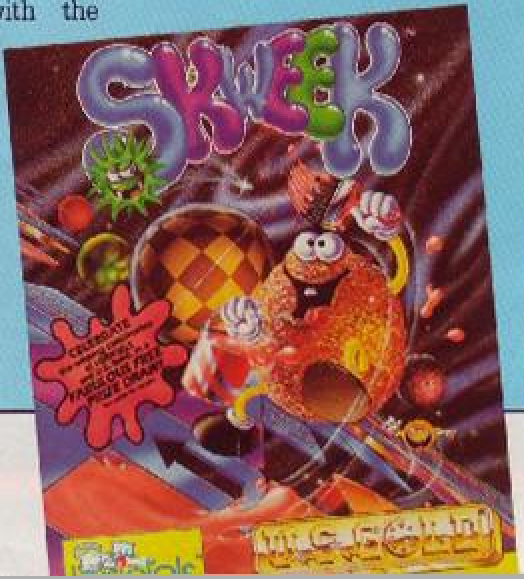
Skweek himself is a small ball of fur in a sea of blue, his four way movement suiting the rightangled tile-world in which he lives. You send him scurrying around, painting his heart out when a beastie glides onto the screen. Like *Pacman*, each creature has a particular style of attack. The onion shape boys are the worst, endlessly jumping around the place as if they've drank too much coffee, and as fast as *Skweek* with the turbos on full blast!

Octopuses fire rebounding shots that seem to track *Skweek* even when he tries to hide. It's outrageous! Why can't these monsters act like normal people and stand on chairs when mice-like animals enter the room?

In normal game mode, you meet new dangers at the rate of two or three a level as you progress. In random mode you can find the mouseketeer *Skweek* transported to any level from the pushovers up until levels where you don't even know how to start.

On the more ridiculously tough settings self-destruct 'POW' tiles actually trap you in a corner as your path disintegrates leaving you scrambling for floor (or just plain dead!). Other times you come face to face with arrow tiles that drag you along a long and winding path only to deposit you into a hole, or onto slippery slidy tiles that quite defeat any kind of direction. Once on these it's a case of trusting to luck and hoping that great *Skweek* in the sky is smiling – a rare event indeed.

The whole look of the game with the cutesy characters seems directed at the lower end of the age range. Yet anyone of any age will immediately be seduced by *Skweek's* subtle charms, simply because it's fun and quite different. There is only one question that must be answered: why doesn't the little geezer actually ever make a noise, let alone a squeak? Still, I suppose a game called *Mute* wouldn't do too well, would it? **TW**

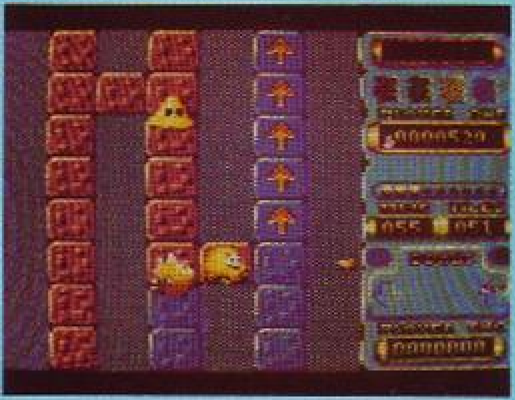


French connection

Skweek is the first fruits of a new US Gold/Loriciels tie-up, and the French connection goes some way to explaining the 'cute' spelling of the title.

It's just the first of an expected ten games coming across the channel over the next year. And it is certainly about time that we were granted access to Gallic software, which has a reputation for being well-crafted and sophisticated. And while *Skweek* can claim to be the one, it can hardly be called the other.

FIRST DAY TARGET SCORE
two sets of Teds in succession



● A night on the tiles

SECOND OPINION

"You'd have thought that Codemasters had the furry cuddly bunch all covered with Dizzy – but you'd be wrong.

"Skweek is daft, but great fun – try it!"

SC

GREEN SCREEN

Impossible, since the game is based on colours. Not recommended

The Verdict

GRAPHICS 84%
- ☐ Pretty in pink – tough luck if you don't like the colour!
- ■ Invisible in green.

SONICS 82%
- ☐ A jolly, happy tune..
- ■ you'll grow to loathe.

GRAB FACTOR 92%
- ☐ Instant addiction.

STAYING POWER .. 72%
- ☐ Trillions of levels!
- ■ Some areas are simply unplayable.

AA RATING 82%

- ☐ Enjoyable entertainment that could become an obsession. Dizzy look out!

TIMESCANNER

Activision ● £9.99 cass, £14.99 disk
keys

Could you cope with a magical mystery tour of pyramids, ruins, alien desert lanscapes – even time itself and play pinball at the same time? With *Timescanner* on your CPC it's just a walk in the park as four different tables, two screens high, await you in your very own arcade.

Now pinball on a computer sounds a bit lame. Tell the truth, it sounds *very* lame as a game concept. Surely pinball died a natural death years ago when *Space Invaders* burst onto the scene? Wrong! It's back with a vengeance, and will have you beating your keyboard into submission for hours to come.

AA RAVE! AA RAVE! AA RAVE! AA RAVE! RAVE!

The game opens with the Volcano, an ordinary looking everyday pinball table, but all is not what it seems. You fire your first ball into play. Flippers at the ready, it's a waiting game as you ball ricochets around the pins and bumpers. Lights flash as your score starts to build up. You notice that when certain pins go down the bumpers score more points and a strategy starts to evolve.

The speed is a bit daunting at first, you just don't expect a computer game ball to move so sharpish. Flexing flippers, a feel soon develops for the way to get the ball where you want it, when you want it there. Eventually a mistake is inevitable and the ball trickles past your guard. Yet the ball is not dead! The screen scrolls down to reveal the bottom half of the table. Again all the trimmings are there, but this time there are also clear tubes that provide access back up to the top part of the screen.

Firing a ball up from the bottom half also triggers one of the many bonus features, and the word volcano starts to light up. When the word is complete an eruption occurs, and to your surprise out shoot not one, not two but three balls for simultaneous play. This is supposed to be to your advantage (who are they trying to fool?). One ball is bad enough, three over the top: you just can't concentrate on three places at once and the flippers take a bashing as you desperately try to keep every ball in play.

Other such tasks must be completed, apart from notching up a gargantuan score, before you can shoot for the 'time tunnel' and get transported to the next table. Saqqara is next – a deserted, desolate table with fewer pins and more traps. Shooting the ball back up to the top of the table here is nigh on impossible, while keeping up there in the first place is even more troublesome.

After Saqqara comes the ruins table – possibly the best – and here things really start to get out of hand. One feature starts to collect your balls and display them in the lower section. This just looks showy, until the 'Xtra ball' feature lights up. Suddenly all your collected spheres smash their glass casing and once again there are multiple balls shooting around in play. Survive this baby and if your nerves are not too shot or fingers too sore it's special level time.

The final level of *Timescanner* features a *Breakout*-style game, so as well as scoring oodles of points you've now got to wipe out blocks as well. This once and for all kills any idea that pinball is a simple game, for in *Timescanner* technique and feel in the way you play are everything. Understanding of how the ball rolls and bounces is vital to employ the tilt feature to full effect. – Yup, you heard right, the game is designed to incorporate a simulation the thumps desperately administered to real tables to stop the ball going out of play. Press the right key at the right time and the whole screen shakes as you tilt the table to encourage that tiny motion that will save the day.

Timescanner is a simple concept laced with an unexpected level of complex game strategy – the goals soon become clear, while achieving them requires the deftest of touches. The situation is made even more fun with the cranked up pace and myriad methods of scoring. It won't take much time to see all the levels, but that's not the point. With pinball it's scoring more points than anyone else ever in the history of history itself that matters. Let's roll...! TW



● Flipper 'eck! *Timecanner's* lays the table

SECOND OPINION

"This game has no right to be so good. I mean, pinball? Come on you guys!

Yet Timescanner has that elusive something that drags you back for more, just when you'd decided to switch off. Trent's got the hi-score – 1,208,400 at last count – but I'm only a coupla hundred thou. behind.

Aargh! He's just beaten his own record. 'Scuse me, catch you later..."

SC

GREEN SCREEN
no hassle

● A table for two...



FIRST DAY TARGET SCORE
200,000 points

The Verdict

GRAPHICS **84%**
- ☐ Smooth fast balls.
- ☐ Big playing area.

SONICS **89%**
- ☐ Authentic effects build atmosphere.

GRAB FACTOR **86%**
- ☐ Instant addiction.
- ☐ Impressive audio-visuals.

STAYING POWER ... **84%**
- ☐ The real challenge is to get to the top of the hi-score table – like real pinball.
- ■ Are four tables enough?

AA RATING **83%**
- ☐ Great game for veterans and novices alike.

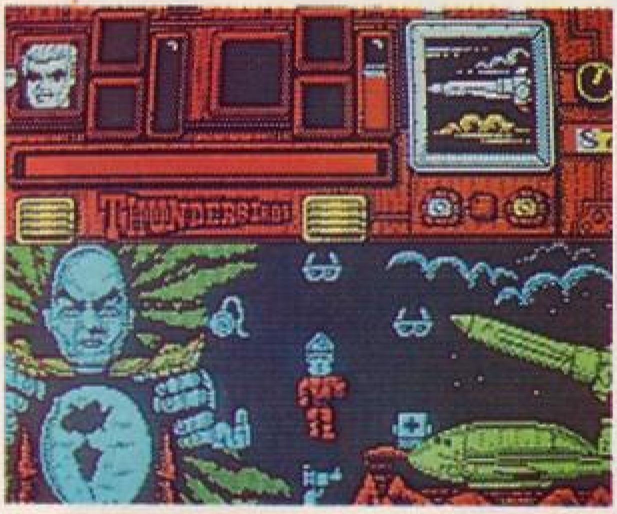
THUNDERBIRDS

Grandslam ● £12.95 double cassette; £14.95 double disk (free audio tape with tape/disk) joystick/keys

Tracy Island, playground of the rich and famous. This oasis in the sea is the domain of the fabulously wealthy Tracy clan and home of the mighty Thunderbirds – known to the world as International Rescue.

John sends an urgent message from Thunderbird 5: some miners are trapped miles below the surface of the earth. The mine is flooding and the workers look sure to perish. Only a miracle can save them now. 'And that's just what you might get,' as Scott Tracy is fond of saying.

Brains is stationed in the mole – I.R.'s super tunnelling vehicle – and Alan flies TB2 carrying it to the scene. Before you can say 'OK father' the mission begins. Brains has tunnelled his way to the bottom of the shaft, while Alan is topside. The plan is to rendezvous with the miners, Alan Tracy bringing the winch



● Calling International Rescue

winch down from TB2, while Brains tries to avert flooding by repairing the pumping equipment. It's a tough task, with the clock to beat as well as the dangers of the mine itself.

As they prepare to go in, they have the choice of two pieces of equipment that will help the rescue – a choice of everything from flash lights to guns (grease guns that is!). Each IR member is only able to hold two items at any one time, so success is dependent upon knowing where to 'dump' items for Ron (=later on). The mine is very dangerous, though, pitfalls (literally) awaiting Alan or Brains if you let them charge into the darkened (heavy playing hint) tunnels.



● Like a puppet on a string...

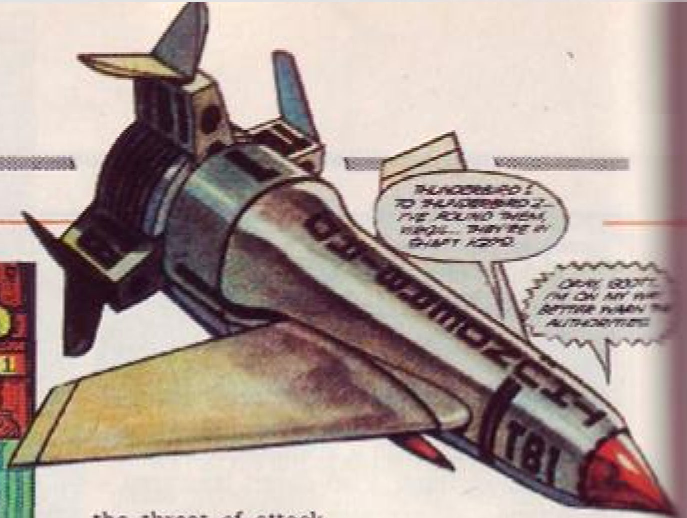
Brains is in the most immediate danger as he tries to stop the mine becoming an underground pool. He's forced to negotiate old and very rickety lifts and blocked passageways before he gets a chance to stop the water. Take too long and the guy with the specs takes an early bath – embarrassing as the whole IR team abort their mission and save him. Alan's main task is making his way quickly down to the miners. There are some helpful devices to speed him along – but again it's finding where they are and how to use them.

You control both characters at the same time toggling between pictures of them in action individually, which works like a 'cut' on TV. The game manages to retain the authentic *Thunderbirds* flavour: heads are too big, lip movements have nothing whatsoever to do with the message screen, and to see them swim is classic Anderson. It's with wobbly heads and silly walk the woodentops carry out their missions – just like the real (real?) thing but without the strings.

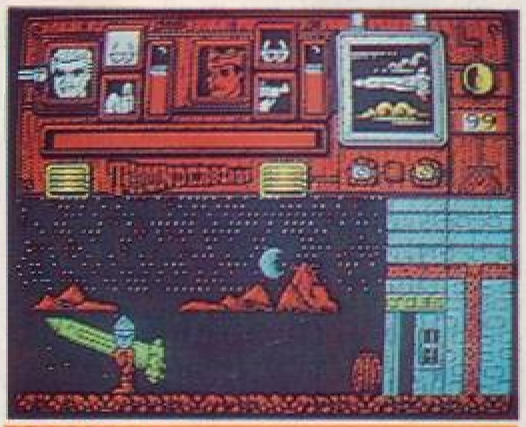
There are three further increasingly complex adventures for the *Thunderbirds* to complete if the world is to be saved. Alan and Gordon are dispatched with TB2 and TB4 to the aid of the Oceanic Star, a submarine crippled by the Hood's sabotage. This time the main danger is not falling rocks, but radiation and water flowing through the vessel. The water needs to be evacuated, but most importantly the nuclear reactor must be shut down to avoid poisoning the ocean. Good grief, even *Thunderbirds* are green now!



Of course being under the sea brings new difficulties, such as the need for oxygen and



the threat of attack from sharks, who strike before you can say F.A.B. Life is made all the more strenuous by a tighter time limit. TB4 stands by as a means of escape if things turn nasty, but the sub (and the environment) must be salvaged if you are to get the third and best stage...



● Great Scott!

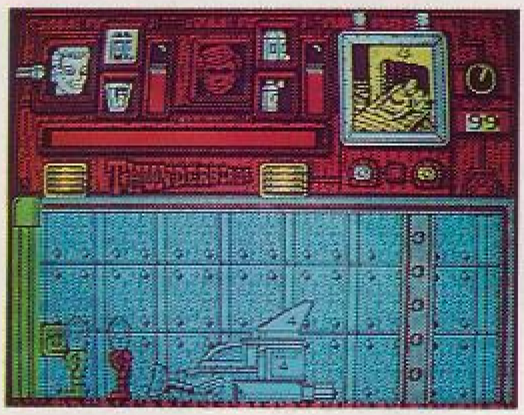


● Yes, M'lady?



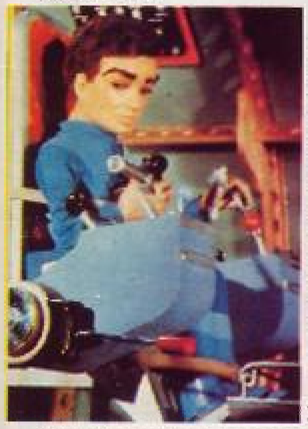
● Ever get that sinking feeling?

The coffee pot communicator starts to buzz. Lady Penelope answers the secret communication from Jeff Tracy, head honcho on the Tracy ranch. The World Intelligence Executive accident report on the Oceanic Star has identified the culprit behind the mining of the sub. Whoever planted the mine also filmed TB2 at the scene, but red tape stops them giving IR the Hood's name. In order to



act effectively all IR operations must be top secret, so Parker and Lady P. are asked to break into the bank and steal the file. Later other *Thunderbirds* can regain the tape.

As well as the guards and the security systems that are set to delay and capture the intrepid pair, there are also a number of puzzles that require action from both characters to solve. The tension reaches hair-tearing stage when, deep inside the vault with the clocking ebbing away, you're forced to try various combinations of switches to open doors or get tools.



It's well worth investing time doing some biographical research on the characters, because special personal skills are required to complete the mission. Can you work out how to rob one of the safest banks in the world? If you do ncluding part of the *Thunderbirds* drama is yours to attempt.

Having established that it was your arch enemy The Hood who's been causing you all this grief, it's time to go and sort him out once and for all. You're not out to blow him limb from limb, however for *Thunderbirds* are far too nice to go around killing people. After all, it's impolite – and bad for the ratings. The Hood, though, has no such moral problems, and is preparing to blackmail the world with a fiendishly evil plan. International Rescue are the world's only hope, but that hope is fading fast as time runs out.

SECOND OPINION

"Although it's not as instantly attractive as some games I've seen, Thunderbirds has the kind of depth and longterm appeal that I find really rewarding. It seems like a game you won't tire of after a couple of days.

"And it's unlikely that any game this year will provide better value for money!"

SC

GREEN SCREEN

OK, father!

INTERNATIONAL RESCUE CREW ROSTER

Jeff Tracy – Founder and father of the Thunderbirds. Multi-millionaire owner of Tracy Island.

Scott Tracy – Eldest brother and pilot of TB1. Educated at Oxford, but don't hold that against him.

Virgil Tracy – Technical expert and pilot of TB2. Highly musical.

Alan Tracy – Trained astronaut and pilot of TB3. Also a grand prix champion driver. In love with Tintin.

Gordon Tracy – Ex member of WASP (see your Stingray annuals), pilot of TB4.

John Tracy – Pilot of TB5, spends long missions alone in space due to excessive ugliness.

Brains – Real name Horatio Hackenbacker. Child prodigy and genius, designer of the Thunderbirds.

Kyrano – Long time friend of Jeff, does the cooking (right on) and looks after the decor on Tracy Island.

Tintin – Only daughter of Kyrano, deeply in love with Alan. Technical Expert.

Lady Penelope – Aristocratic ex-secret agent: rides a six-wheeled pink Rolls Royce, FAB 1, chauffered by Parker.

Parker – Aloysius Parker, reformed burglar recruited as chauffeur by Lady P when caught robbing her house.



The graphics are a Spectrum upgrade, as the programmers at 'Slam HQ decided that it would be more appropriate to have comic cartoon style [illegible] blocky [illegible]. The screens are [illegible] and [illegible] with great depth of field – with [illegible] example, the Tracys apparently walking [illegible] of pillars. The humorous ele[illegible] very strong, entirely replacing the need for violent action. Just select [illegible] as an item on level four to find [illegible] what [illegible]!

Thunderbirds cannot [illegible] called action packed and [illegible] very obviously Speccy style. But [illegible] game plays brilliantly, and has enough problems and puzzles to keep even Brains busy for weeks. Coming [illegible] a two cassette/disk pack with [illegible] of all your favourite Thunderbirds [illegible] it's [illegible] value. When you've [illegible] *Wolfed* [illegible] barely touch a joys[illegible] get out your *Thunderbirds* and give your brain a thorough (and, for the older ones among us, a nostalgic) workout.

TW

FIRST DAY TARGET SCORE
finish Mine Menace (level one)

The Verdict

GRAPHICS **72%**
- Souped-up Speccy.
- Great detail and variety.

SONICS **90%**
- Fun effects.
- Audio fun with the theme.

GRAB FACTOR **89%**
- Everyone loves the *Thunderbirds*.
- Mine menace is survivable and solvable.

STAYING POWER .. **95%**
- Four vastly complex and huge levels.
- Time limits make life very awkward.

AA RATING **90%**

- Outrageously good value for money.
- *Infuriatingly* addictive fun!

SILKWORM

Virgin Games ● £9.99 cass, £14.99 disk joystick/keys

Peace through superior firepower – a motto that will serve you well in the world of *Silkworm*. Forget subtlety, forget style, just thrash and trash. Missiles are in unlimited supply, and as luck would have it so are the enemy.

The world has been ravaged by two small(!) nuclear wars. The politicians of the world finally see sense and scrap their apocalyptic arsenals in favour of conventional weapons. Naturally the generals wanted something in exchange for the ability to vaporise a planet. They demanded thousands of tanks, planes and assault helicopters until their bullets and bomb power matched that of their fission heyday.



● Floats like a butterfly, stings like an Apache AH-64A!

After years of relative peace, however, those lovable chaps in green got bored of just 'playing' soldiers and have launched a coup to topple one of the major alliances. Thing is, if they take power they will give themselves back the bomb which could prove to be a pretty terminal situation for everybody.

These dogs of war must be stopped. Fortunately a few weapons scientists have escaped from the army bringing with them a small number of experimental helicopters and war jeeps. All that's required now is one or more volunteers to take the battle to the enemy and try to kill the top brass before they have a chance to toast us all.

Your mission is simple, you're to fly through enemy lines to attack the command 'copter, in which the generals reside. The first few waves are easily dispatched with fancy flying/driving and continued use of the trigger: just so much missile fodder. Each general though has a variety of special defences that must be avoided or killed to get to him.

Every level features plasma mines intended to destroy the jeep, but this is something that actually plays into your hands. If shot these mines release a cloud of gas which can protect either vehicle from oncoming foes. If two of these mines are exploded and both clouds caught, then the chemicals react together and create an explosion effectively smart bombing the whole screen.

Some generals have large 'deathstar satellites that take repeated shots before blowing up, others have tanks parachuted in just to add to the fun. Most levels though share one chief nasty – a gooseneck battle chopper. These helicopters fly onto the screen as six component parts and are invulnerable until they assemble – and are still virtually indestructible when joined together! They only have one weak spot, the eponymous goose neck, where the cabin joins the main body. Heavy duty blasting is required to get that one lucky shot and life is an awful lot easier in two player mode where more angles and more shots means more chances.

When a gooseneck chopper is finally shot down in flames (roast goose – lovely!) you can gain double firepower, strictly necessary if you are to survive the whole level. After picking up the extra blasting potential it soon becomes apparent why it's needed as onto the screen scrolls the biggest helicopter you ever did see. This is the generals' hide away, and the thing is not only hard to kill but has a mean selection of armaments to back up its threatening visage. Huge 'exocet' missiles are sent after the chopper, ball-mines are dispatched to bounce the jeep to death and homing missiles are sent launched to mop up anything they miss.

With the special weaponry and two players the first few command choppers aren't too tough, but lose your extra firepower and/or your partner and the whole thing becomes a nightmare. Having finally killed the enemy in a series of blinding white flashes you are transported to the next level where the whole sequence is repeated in faster, more densely packed form. Tooled up as you are with double shots, you start to think, is this as hard as it gets? Just wait, no sooner do you start to feel cocky than jets literally scream in on kamikaze runs. These boys really move and quick waggling becomes a matter of the utmost importance just to survive, let alone amass points!



● Bang goes the peace plan!



● Hang onto your hat, chaps, we're going in!

The screen is always action packed, and the graphics are bright and move real fast. In two player mode the suppressing fire you can lay down is truly glorious, the helicopter best for attacking ground targets and the jeep airborne. It is also a shoot'em up that's very easy to get into, the first few levels being reasonably easy to survive, if not beat. It makes no claims to be innovative, just good clean blasting fun, a claim it lives up to admirably. **TW**

SECOND OPINION

"Though ultimately it's a very limited kind of a game, Silkworm has enough going for it – especially in two player mode – to make it worth a try. It's no classic, but it's no dog either." SC

GREEN SCREEN

smooth as silk

FIRST DAY TARGET SCORE
reach level three solo/
reach level six as a pair

The Verdict

GRAPHICS 83%
- ☐ Detailed and speedy sprites.
- ☐ Huge end of level 'chopter.

SONICS 64%
- ■ OK explosions...
- ■ and more fizz than fire for the gunshots.

GRAB FACTOR 79%
- ☐ Easy to get going.

STAYING POWER 65%
- ■ Gets repetitive.
- ■ Little level variation, just more enemies.

AA RATING 72%
- ☐ Simple but splendid.
- ■ With a little more complexity *Silkworm* could have been even stronger.

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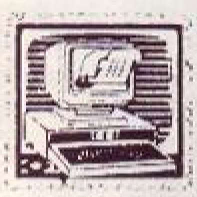
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SKATE OR DIE

Electronic Arts ● £8.95 cass, £14.95 disk joystick/keys



● 'Seasy, this – anyone could do it!

Let's meet and greet, folks, surf punk Lester, a man born to ride the sidewalks on his customised day-glo board. His worldview is simple: *Skate, or Die.* Middle ground is not a phrase in his vocabulary.

Decked in luminous jams, baggy T-shirt and mohawk haircut, the guy *lives* the part. The question is, dare you join him on his crazy downhill charges, jousting in an empty pool and performing ridiculous tricks on a ramp?

SOD offers boarders five ways of living on the knife-edge between wild fun and serious physical damage. Show out on the ramp, doing freestyle or hi–jumps, race through back streets fighting with Les, or sort out who's the boss in a face to face showdown in the joust. You can even, if you're really sick, opt for a downhill race with jumps, hurdles and tunnels. A *novel* way to cripple yourself permanently.

The freestyle arena, with the high jump and tricks option, is the most exhilarating on offer. You build up momentum and start to fly. All manner of stunts can be introduced to the routine to gain points. Hurtle off of the screen – hey... Why not? – into the sky spinning like a top, arms casually flung above your head. Grab the lip of the ramp as you shoot past and pivot, doing a 360, or simply balance on the edge using exquisite balance to defy gravity for a couple of seconds.

These manoeuvres have their perils though, as your kneecaps all too soon discover when a trick backfires. Try to use the wrong part of the ramp, cut too sharply or forget to line your board up with the landing strip and you sprawl to the centre, your deck smashing into your knees. No permanent injury is ever sustained, this being software an'all, so you're soon back on four wheels.

You use joystick/keys to tell your guy what to do. But only in the loosest fashion, as he invariably does what he wants anyway. Having only a certain repertoire of moves your skater is never going to pull off any great mould-breaking jumps. The same applies to the high jump, set in the same arena but lacks the fun of throwing yourself upside down. All that's involved here is repeated rolling and then launching for the stars.

Get bored of air sickness and progress to other stages and the schizo nature of the game soon reveals itself. Continuity? Forget it! The switch to racing against Lester is accompanied with a change to monochrome. Downhill requires a great degree of luck (to get obstacles lined up) as well good judgment to avoid the many dangers. Jax – fighting on skateboards while rolling through a deserted alleyway – is much the same with different backgrounds. But you do at least get a better class of crash, such as the wire fence which neatly slices you into bite-size chunks.

The final stage – though stages can be played in any old order – is The Joust, in which you face Our Boy Les and a coupla friends, guy (know whaddamean?), in a head to head. Ultra violence on wheels is what it should be, but it ends up (or down) as a rather confused game of pass the baton/follow the leader.

On some levels there's a "goofy foot" feature, which – hey, get this – *inverts the direc-tion/control relationship!* Quite what this is supposed to represent is unclear: it's no fun at all to be completely out of control on and off your board, and the only result is the inevitable crash. It's frustrating and by no means a challenging modification.

Skate or Die is chockful with good ideas, but obstinately fails to deliver on all but one of them, namely the freestyle. Ultimately what it lacks is a coherent personality to bring out the humour that's so obviously there. It could have captured (and on the tricks section does capture) skateboarding's going-for-broke spirit. Bitty structure erodes this fast, and while the game is bound to sell in droves because EA have cashed in on the current skate craze, the conceptual effort could have been more fruitfully implemented.

TW

Wild Bunch

The characters responsible (if that's the word) for *Skate or Die* – Michael Kosaka, Stephen Landrum and David Bunch– are a self-confessed "wild bunch," about whom nothing is known beyond a few strange and worrying facts. They list their hobbies, wackily, as "bare-handed jackal hunting" and "sculpting rodents out of ceramics."

Oh dear. You should remain in your homes until the apprehension of these people has been announced. Emergency services have been alerted.

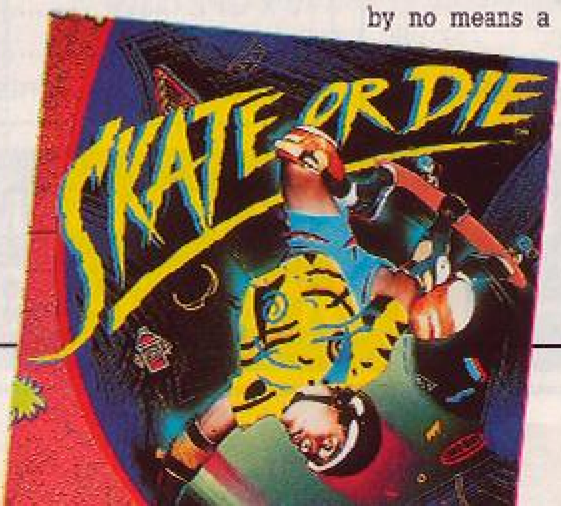
SECOND OPINION

"Oh for what might have been! At times SOD really does get off the ground and become airborne, only to be brought down hard by mono grapics, poor sound or the bizarre lack of consistency in appearance and gameplay. And what's with this 'Goofy Foot' stuff anyway?

"I've long been one of EA's biggest fans, but this one never gets above the mediocre. It looks like a troubled project, and plays like one." SC

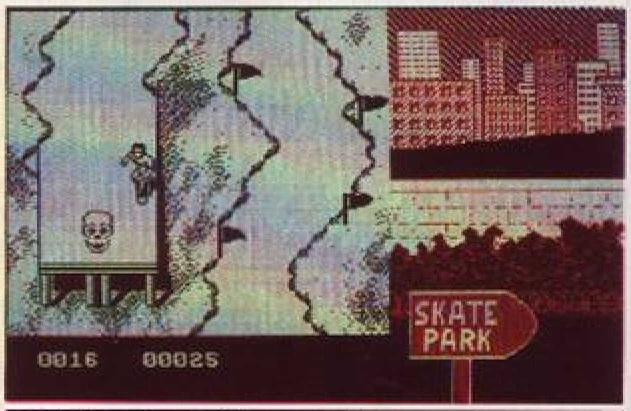
GREEN SCREEN

you're not missing out on colour!



FIRST DAY TARGET SCORE

10,000 points on tricks



● Skateboards away!



● Whooo-aa-arrgghhhh!

The Verdict

GRAPHICS **47%**
■ A pick'n'mix of graphic styles.

SONICS **37%**
■ Underwhelming.

GRAB FACTOR **64%**
□ Great idea, and fun for a while.

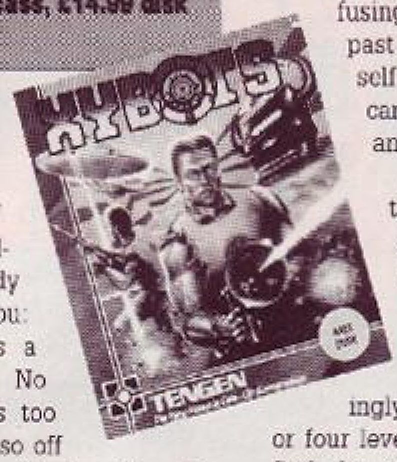
STAYING POWER ... **27%**
■ No depth for repeated play.
■ Many stages, but little variety.
■ Unlikely to be a favourite.

AA RATING **48%**

□ If this is skating I'd *rather* die!

XYBOTS

Domark/Tengen ● £9.99 cass, £14.99 disk joystick/keys



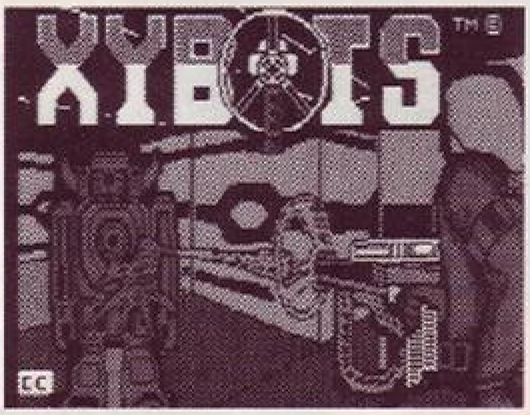
The air is charged with burnt ozone, the blaster cannon is red hot in your hands, while in front of you lies a twisted smouldering xybot. Major Hardy casts a wry smile at you: "The only good xybot is a dead xybot," he mutters. No time to rest though, there's too much metal to melt. And so off you charge into the smoke filled corridor. 'Do you feel lucky 'bot? Go ahead, make our day!"

Captain Ace Gunn and Major Rock Hardy – daft names, or what? – are raiding a xybot base. The mission is to kill the master xybot, and wreak as much havoc as possible along the way. A straight firefight is out of the question, since xybotland is a confused mass of mazes and teleport systems. Stealth and tactics are more effective than brute force, but you've got to be ready to stand and blast in critical situations.

The first few levels of xybotsville are mapped out for you at the top of the screen to help you find the tin men and the exit. Later this map is drawn as you venture around vapourizing 'bots, which only really helps in retreat. Alongside sit status boxes constantly flashing news to you of imminent demise and weapons info.

The maze feel is enhanced by using splitscreen perspective graphics. Your guy chases off down the corridor and the whole room moves past him. He can easily (except in combat) be turned to look around corners and on unknown levels both parties can split up and share their information. It's really confusing to watch as your mate steams past and you catch a glimpse of yourself from his angle. Remember, you too can be hurt by the other guys shots and not just the 'bots.

Xybots does have a few twists to justify wholesale destruction. Firstly you've got to collect the various items left lying around the place to improve your chances of a long and happy life, secondly to beat increasingly nasty Master Xybots every three or four levels. Most importantly you need to find the energy capsules vital to life. The energy limit (effectively your time and hits counter) runs down real quick, and it's necessary to pick up supplies along the way on the larger levels just to cover the ground.



● Major Rock and roll

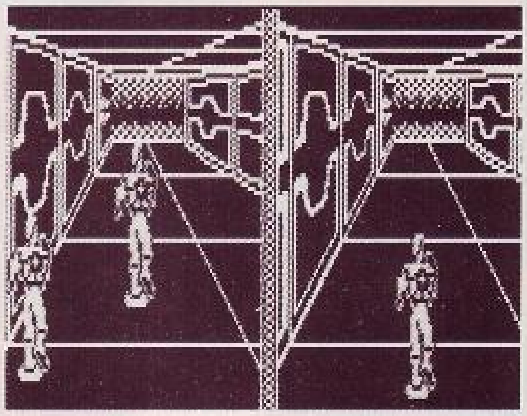
Some 'bots are more difficult to kill than others, armoured up and only exposing themselves *(?)* when shooting you. Huge blue 'bots roam about and while easily killed they've powerful cannon. Some xybots come at you on suicide runs wiping out vast amounts of life energy if successful. Sundry other surprises include walls which open when unlocked to reveal large numbers of trigger-happy androids breathing oil fumes in your face.

As usual in this sort of war zone someone's out to make a quick buck and yet more weapons shops have been opened to tool up nutters on the rampage. There's money to be made in supplying the bloodbath trade, first *Vindicators*, then *Forgotten Worlds* and now *Xybot* Central. Everything can be bought for a price. Enormous coins are left around by zapped xybots for you to pop into your piggy bank and save toward a stronger shield, guard mapper or what you will.

The two player option confuses matters but also adds a new dimension to play with the ability to outflank enemies – but of course the same is also true for the boys in tin. Things get mean out there in 'bot country and you can never just take things easy. Lasers are always screaming in from distant 'bots and new style machines constantly rear their ugly bonces, forcing you to discover how on earth to go blow it to pieces!

An exceptional arcade conversion in its accuracy *Xybots* falls short of the mark. No programmer can convert a coin-op and make it brilliant if the coin-op falls short in the originality department. *Xybots* in either form – CPC or arcade – is exciting for twenty minutes but dull after an hour. Running round and roasting robots is passable fun, but it doesn't hold up well for long, even with tight time/energy limits to inject tension. *Xybots* does have one saving grace: when the game gets dull you can always turn rogue and surprise your partner with a few stray shots!

TW



● Kicking 'bot!

FIRST DAY TARGET SCORE
70,000

The Tengen connection

Domark's much-vaunted Tengen label is proclaimed as "the new name in coin-op conversions." First out of the starting blocks a few months ago was *Vindicators (AA43)*, which was deservedly Mastergame. Other projects on the boil for later this year include *APB* (which stands for *All Points Bulletin)* and *Toobin'*. With two excellent conversions – *Xybots* limited only by the mediocrity of the original – we look to be in for a real treat if the Domark boys can keep up the good work!



● *Vindicators* – the first Tengen/Domark release

SECOND OPINION

"These guys walk like they've spent the week on a horse – which is true to the arcade. In fact everything about this game is as arcade-like as possible on the CPC. Which is a pity, because I never was that crazy about it."

SC

GREEN SCREEN still smart

The Verdict

GRAPHICS 82%

- ☐ They keep that original flavour.
- ☐ Games screen complex but clear.

SONICS 75%

- ☐ Eerie atmospheric tune.

GRAB FACTOR 61%

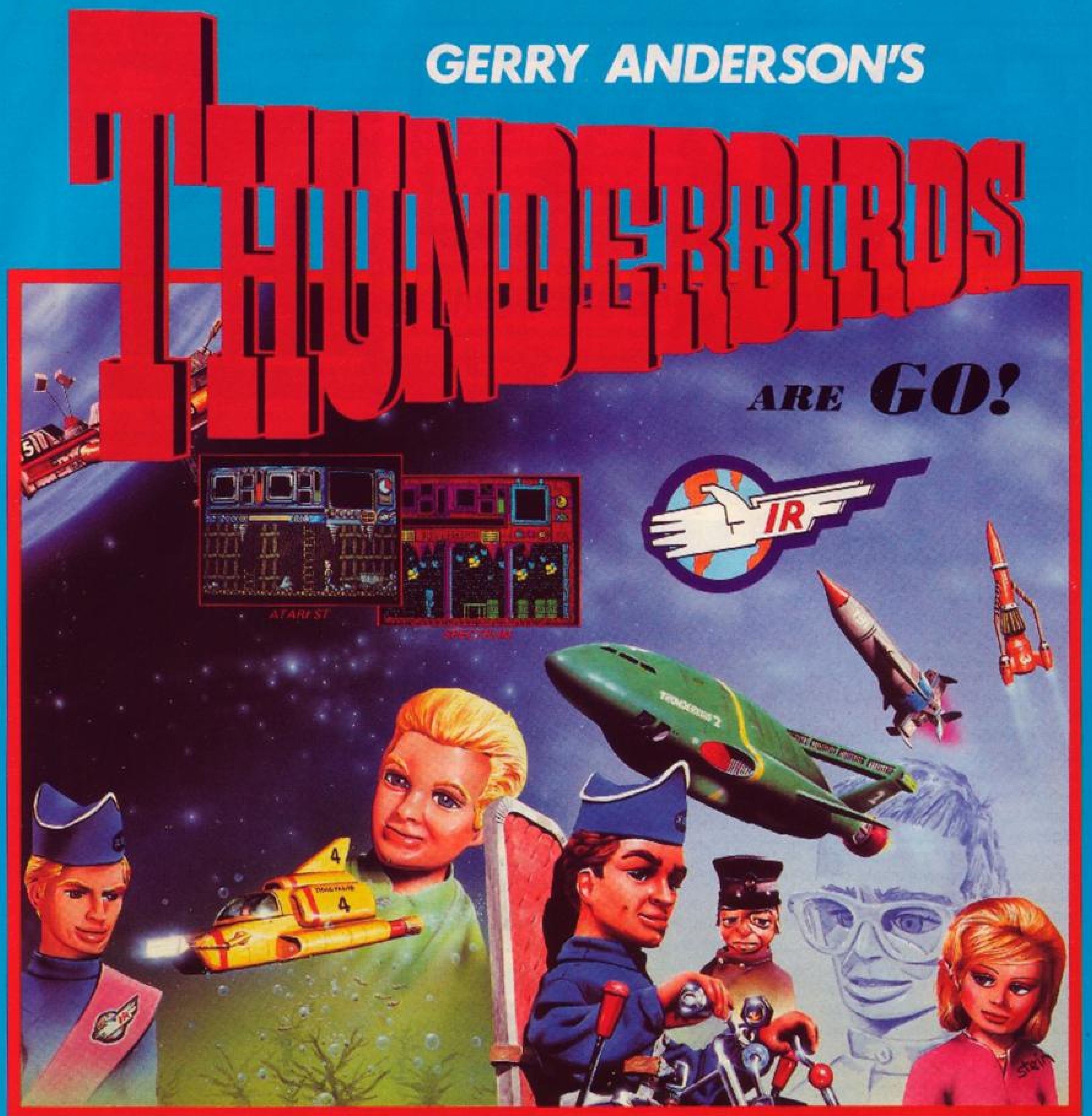
- ■ Controls are strange to use...
- ☐ ... but the best solution to a tricky problem.

STAYING POWER .. 69%

- ☐ Loads of levels to hunt around.
- ■ Kill and collect is all there is to do.

AA RATING 76%

- ☐ Quality conversion of an average coin-op.
- ■ Only as good as its parentage allows.



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THE GAMES – SUMMER EDITION

Epyx ● £9.99 cass, £14.99 disk joystick/keys

Tension mounts as athletes crowd the arena. *Bang!* They're off, with the deafening roar of the crowd ringing in your ears. Then the TV packs in and the excitement is gone. "Not so!" I hear you cry: "what about *Summer Games*, *Winter Games* and now *The Games* by Epyx available now from all good software shops?"

This latest edition is lightly and somewhat belatedly based on Korea 88, and bears perhaps not unexpectedly a remarkable likeness to the other Epyx sports sims. There are eight events and nice opening and option screens. The events include archery, velodrome cycling (don't worry, I had never heard of it either), diving, hammer throwing, hurdles, pole vault, rings and uneven parallel bars.

The options include practice (disk only), review world records or go right in and compete with up to seven other players. The opening ceremony shows a map of Korea and pictures of its culture, while A Sickening Tune plays throughout.

● Diving is great fun, especially trying out the different variations. The diver can be made to spin, swan dive, belly flop or indeed do all three – and more. The only problem is that it is difficult to see where you ought to land, which can make for an interesting landing.

● Next is the velodrome, a sort of cycling up the wall against an invisible opponent (yes, really). It requires a good deal of waggling and a great deal of patience. It's rubbish.

● Alisdair Swanney, 14, wrote this review while with us on a week's work experience, in between giving the *AA* office the best tidy-up it's had since Trent lost a disk with a whole month's games reviews on it.

● The uneven parallel bars are like diving, with numerous easily mastered moves. Having said that, all I could manage was to push the joystick and hope I didn't fall off.

I fell off.

● The rings are the hardest event, and I did some more falling off before I could get properly started. But you can perform several moves, at least that's what the instructions say.

● Hammer throwing requires technique or the hammer wraps itself around your head.

● Hurdles is good but hard. You don't have to waggle too fast: it's more a case of accuracy. This probably explains why I can only do two before somersaulting and looking dizzy.

● Although the pole vault has been done numerous times before, this version is as good as they get. You build up speed by waggling rhythmically as the man runs towards you, and then you see him vaulting sideways on.

● Archery is my favourite. First you pull back the bow by pressing fire, then you take aim – a great deal of experimenting is needed at this stage. Finally you let fly by pressing the fire button again. Then it's time to see how you did, and to work out what went wrong.

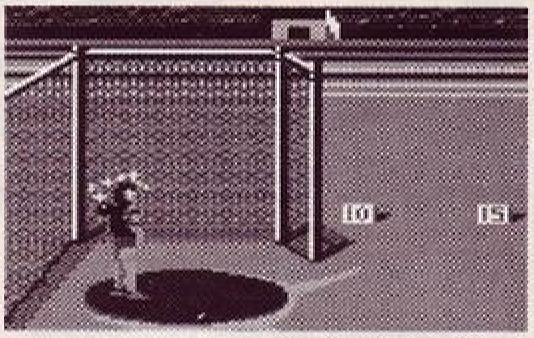
Having competed in all these events it's time for you receive the medals and listen to The Sickening Tune again.

This is only the second *Epyx* sports sim I've played, and I must say I enjoyed it. The instructions are well set out, and the diagrams and chalk talk (as the playing tips are rather cleverly called) are especially good. Inevitably there are bad points – the odd duff event, in this case velodrome cycling, and the fact that it's a multiloader. Overall, though, *The Games* is well worth investing in if you like this format or you're just beginning to build up a software collection. It may not occupy your screen for ever, but it's fun while it lasts. AS

SECOND OPINION

"Undoubted good value in that you get eight different events in one (multiloading) game. Worth it if you don't already have any similar compilations." SC

GREEN SCREEN
no bother



● There must be easier ways to get hammered...

FIRST DAY TARGET SCORE
Try not to fault when you vault!

The Verdict

GRAPHICS 82%
- Lots of colour.
- Very detailed, too.

SONICS 45%
- The odd hardly realistic beep.
- A Sickening Tune.

GRAB FACTOR 68%
- You have to wade through the instructions.
- After that you can't stop!

STAYING POWER ...73%
- You can continue to improve.

AA RATING 71%
- To be kept for a long afternoon.

SUPER SCRAMBLE SIMULATOR

Gremlin ● £9.99 cass, £14.99 disk joystick/keys

"Never, never, under any circumstances trust a game with the words Super and Simulator in the title" my old grandad used to say to me. He would never have been taken for a ride by *SSS*.

The race against the clock is split into five sections, each containing three different courses to test your skill as a rider leaping massive obstacles in a single bound. Trenches, though only six inches deep, throw you completely: go too fast and you're in the grass; too few revs and the engine dies between your legs leaving you literally over a barrel.

But disappointingly no bodies fly, and no machinery is smashed. If you can't be a rubber neck what's the point of motor sport? Gameplay is tricky and slow, with controls too closely grouped. Everything is done on the joystick and since simultaneous actions are often required life is not easy.

Graphics are functional and unimaginative. As usual Ben Daglish, who did the marvellous music for *HATE*, has put together a great audio track, but £9.95 for an audio tape is just too much to ask. TW

FIRST DAY TARGET SCORE
clear five stages

SECOND OPINION

"Neither an original theme, nor imaginatively handled. Full price? Forget it." SC

GREEN SCREEN
suppose so

The Verdict

GRAPHICS 46%
- Unexciting.

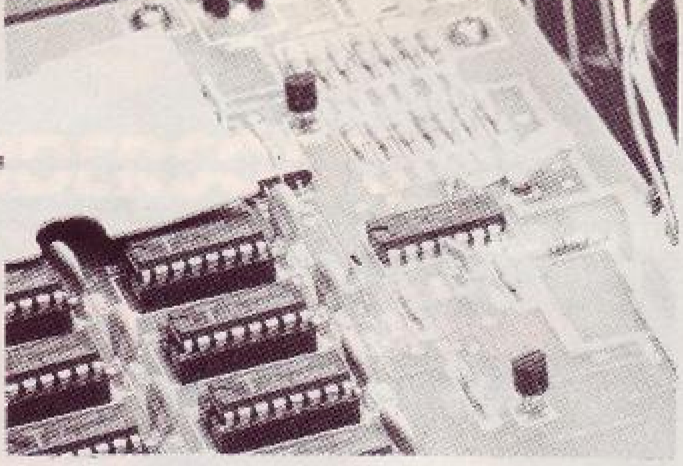
SONICS 84%
- Superb tune, as you'd expect from Ben D.
- Dull sound effects.

GRAB FACTOR 22%
- Far too fiddly.

STAYING POWER ...43%
- Plenty of stages.
- But that's not enough to grab anyone.

AA RATING 39%
- ... I've had more interesting headaches.

Inside out



Part three of STUART McCOLL's series poking around inside your CPC.

We identified a microcomputer earlier in this series, you may recall, as a *bus organised structure consisting of a processor and various peripheral devices*. The choice of input/output devices is clearly flexible, depending on the application - but every system must have a central co-ordinating processor unit (CPU) which can fetch and execute user programs.

So the CPU is the most important single device in any microcomputer - which is why it's necessary to switch our attention to the consideration of a simplified but typical microprocessor architecture.

Without further ado, then, let's crack open that omnipotent (and big) black chip housing the CPU.

What is a CPU, then? Well, in this context, it's that part of a digital computer which implements the system operations. It has a number of internal storage registers – as opposed to external memory, only available to the CPU over the conventional system buses; a combinatoric circuits which perform all the arithmetic and logic micro-operations (see below); and finally a control unit which supervises the sequence of micro-operations.

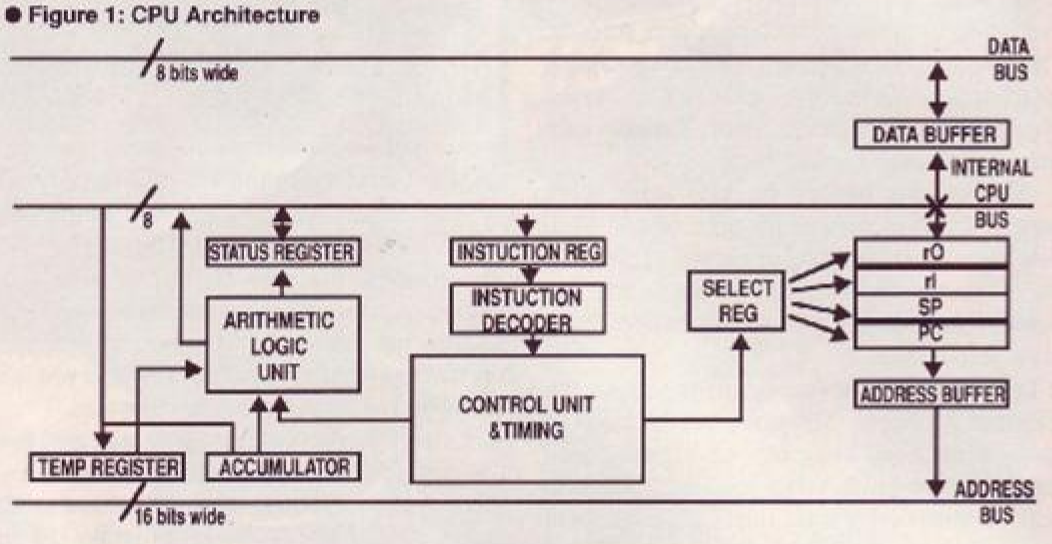
Figure 1 illustrates a simple CPU configuration. Bear in mind that a processor, like everything in a digital system, is constructed from simple devices such as logic gates.

The control unit

It is well known that the lowest level of computer programming is machine-code. But it ain't!

It ain't, because for every machine instruction – the lowest level a computer user can access – there is a corresponding sequence of micro-instructions or a micro-program stored within the CPU control unit.

● Figure 1: CPU Architecture



When the CPU is started (usually by a RESET control input) it begins executing a microprogram which fetches an instruction from memory and stores it in the Instruction Register (IR). This machine instruction is then decoded by some sequential circuitry and the address in control memory at which the corresponding micro-program resides is generated. This micro-instruction is then executed on the next clock cycle. A control unit such as this is illustrated in Figure 2, and is commonly referred to as a Microprogrammed Control Unit.

Don't confuse the control memory with external memory, or indeed the internal CPU registers. It is a completely separate Read Only Memory (ROM) which is built into and accessed solely by the control unit. Each word of this memory stores a micro-instruction, whereas each word of external memory holds either a machine instruction or data.

A sequence of micro-instructions is called a micro-program, and each micro-program represents a series of discrete steps which must be followed to execute a machine level instruction. Such steps are necessarily very simple in their nature (see ALU below) and it is only by convoluted combinations that relatively complicated machine instructions may be provided in the processor instruction set.

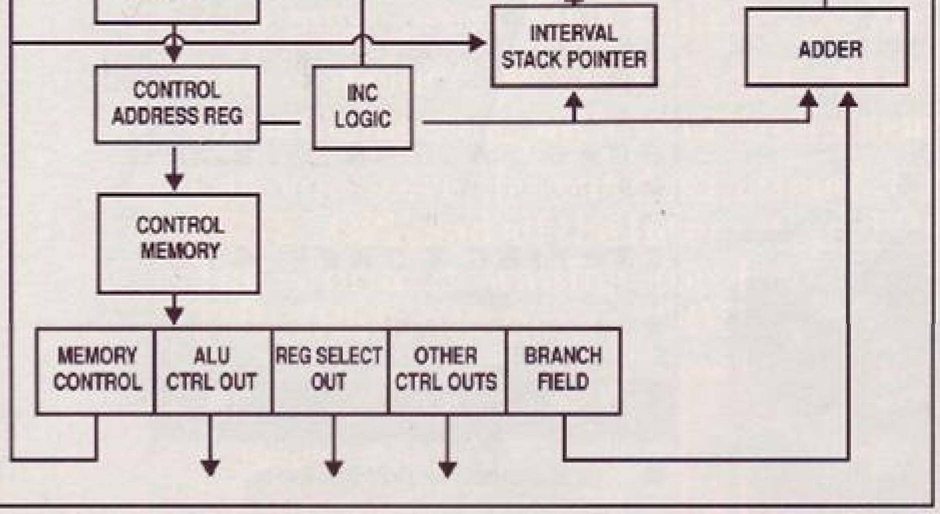
The format of micro-instructions is highly variable, but it must contain fields which can be used to generate the address (in control memory) of the next micro-instruction to be executed, as well as a control field which specifies the required registers and ALU operation. Normally there will be a choice of at least four 'next' addresses fed into the control unit:-

1) the next sequential address
2) current address + relative offset stored in BRANCH field
3) address stored on internal control stack
4) an external address specified by the decoded machine instruction.

The control unit simply selects one of these inputs as the next control address.

Figure 2 illustrates how the various fields of a generalised micro-instruction may be used. The control fields are the source of, for example, the inputs to the ALU function and register select.

● Figure 2: Microprogrammed control unit



The Arithmetic Logic Unit (ALU)

As its name implies, the ALU performs arithmetic operations such as ADD, SUBtract, INCrement and DECrement, and logic operations such as AND, OR, XOR on the data selected as input. These are examples of the elementary operations which can be executed by a single micro-instruction. More complicated instructions such as multiply and divide are performed by repeated addition and subtraction, which must be accomplished by software: the Z80 can't do those without help.

Internal Registers

Most modern processors have a collection of general internal storage registers which are used as inputs and receivers of information from/to the ALU. For example the Z80 processor (as used by your very own CPC) has an ample collection of 16 general registers, labelled A, F, B, C, D, E, H, L, and their dashed alternates *(watch your language McColl – ed.)*.

A few specialised registers are also necessary to enable the CPU to operate smoothly:-

1) The Stack Pointer (SP), which holds the next available address in a LIFO data structure.
2) The Program Counter (PC), which holds the address of the next instruction to be retrieved from external memory.
3) The Instruction Register (IR), which holds the machine instruction currently being executed.
4) A Memory Buffer Register (MBR) which is used to hold data transmitted over the data bus, until the processor is ready for it.
5) A Memory Address Register (MAR) which buffers the external addresses supplied by the PC or SP.

Each micro-instruction of the control unit contains a field which specifies the registers it will work with. For example when each word is transferred from main memory by the 'fetch' micro-program (Figure 3), a microinstruction is executed to update the PC. The register select field of this microinstruction selects the program counter as a data input to the ALU, and the control field specifies an INCrement operation.

Some nasty language

In our discussion of the CPU, I have used the terms Processor and Central Processor Unit (CPU) interchangably, and indeed you'll find that the normally precise computer boffins do the same.

There is, however, a fine distinction. A Processor is comprised of a number of registers and the digital functions that implement arithmetic, logic and shift operations. A Central Processor Unit on the other hand is the name given to a Processor which incorporates a Control Unit.

You'll find too, when reading computer literature, that it is riddled with the terms "Machine Cycle," "Clock Cycle" and "Instruction Cycle," and it is important to understand the distinction.

A Clock Cycle is the amount of time it takes to execute a single microinstruction.

A Machine Cycle (or memory cycle) is the length of time it takes to transfer a word between the CPU and memory, or vice versa. A machine cycle is comprised of several clock cycles.

An Instruction Cycle is the length of time it takes to execute the instruction stored in the IR. It is composed of at least one machine cycle – the opcode fetch, and perhaps several other data transfers.

Can you work out why, for example, a micro-programmed multiply or divide routine invariably executes many times faster than the corresponding machine code program – however efficient? No? Well, look at Figure 3. Every micro-instruction (such as ADD and SUB) is executed in a single clock cycle, which is many times shorter than the time it takes to execute an equivalent machine level instruction.

Decoders

Have you noticed how the word *selected* kept cropping up in our discussion of the CPU? Well, you may have already guessed that there are special devices which facilitate activities such as selection, and it is to them that we now turn our attention...

No, it's nothing to do with cryptography. A decoder is a combinatoric device (which, as you will of course remember, means we can predict its outputs from its inputs) with n–inputs and 2n enable outputs. At any given time, only one of the 2n outputs will be logically TRUE – the other 2n–1 outputs being FALSE. It is convenient to consider the n–inputs as a binary number, enabling one of the 2n outputs.

Figure 4 illustrates a simple one input to two output, or 1–2 decoder, and the corresponding truth table. The logic circuitry – a simple NOT gate – is trivial, and I'm sure you can see how it works quite clearly. If I0 is FALSE (which we will consider to represent binary 0), the top output, E1 will be TRUE, while E2 is FALSE. Similarly, when I0 is TRUE, E1 is FALSE, and E2 is TRUE, or enabled. Thus only one enable output is true at any given time.

Figure 5 illustrates a more practical 2–4 decoder such as that which may be found as part of the CPU register select circuitry of Figure 1. In this case, the logic expressions for each of the outputs E1 – E4 is illustrated next to the corresponding line of the truth table. These expressions introduce the more usual (or succinct) symbols for the logical operators. You should corroborate for youself that these are correct, and that the logic diagram is simply a schematic representation of the expressions.

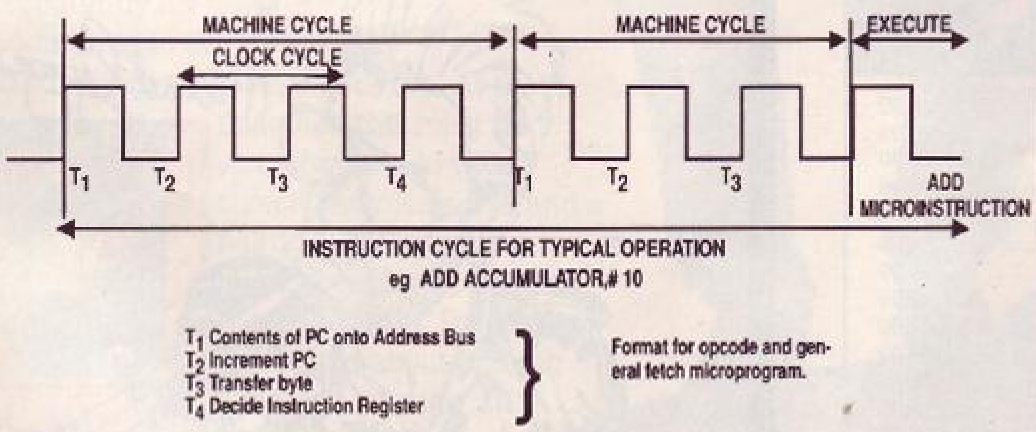
Rather than repeatedly drawing the constituent gates of a decoder (it becomes laborious even for a small 2–4), simple boxes such as those illustrated in Figures 4 and 5 are used as schematic representations.

From Figure 1 how do you think we could use a decoder's outputs to route the selected register through to the internal bus? Or perhaps you can see how decoders might be used in conjunction with a micro's address bus?

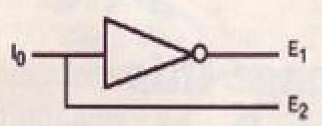
As you can see, I've only covered half of the selection story, so let's see if you can puzzle out the rest before next month. As a hint, I don't think I would be giving too much away by suggesting you investigate the properties of the ever modest AND gate... ●

And Stuart McColl will be giving much more away about the ever modest AND gate in next month's *Inside Out*

● **Figure 3: an instruction cycle**

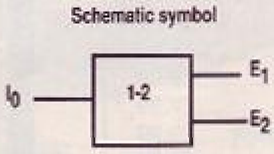


● **Figure 4: 1–2 Decoder**

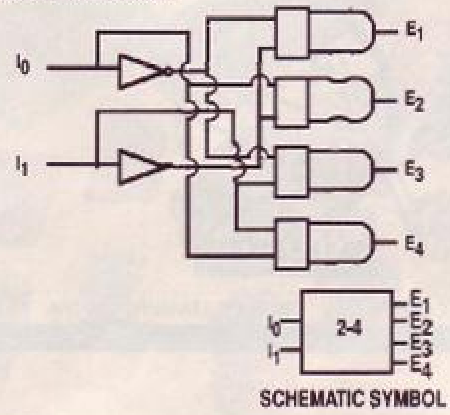


I_0	E_1	E_2
F	T	F
T	F	T

Schematic symbol



● **Figure 5: 1-2 Decoder**



I_1	I_0	E_1	E_2	E_3	E_4
F	F	T	F	F	F
F	T	F	T	T	F
T	F	F	F	F	F
T	T	F	T	F	T

EXPRESSION

$E_1 = {}^{-}I_0 \cdot {}^{-}I_1$
$E_2 = {}^{-}I_1 \quad I_0$
$E_3 = I_1 \quad {}^{-}I_0$
$E_4 = I_1 \quad I_0$

Where – = NOT
. = AND
V = OR
= XOR

Symbols used in Boolean expressions

GO SKATE OR GO HOME



Note: This competition was devised in the absence of the *AA* team, who are all off practising falling off skateboards without doing permanent damage...

Bit of a nuisance, this, *writes Ollie Alderton* (AA *art editor*). Normally I spend my time trying to tidy up the awful mess Steve, Pat and Trent make of their pages. Frankly this job's more trouble than it's worth... However, I'm sure you don't want to hear about my problems. As I say, that's my usual job. But now the lads have actually gone off and left me to write this page all by myself.

Apparently it's all something to do with something called *Skate or Die*. At first I imagined this must be something to do with a choice between a fish and a hairdo, but it turns out that it's a skateboard game from Electronic Arts. Steve said something about it being reviewed on page 53. The last thing he said before he disappeared was to take some photos.





So there you have it. That's me demonstrating the skateboard equipment – fortunately you can't see the bruises from this angle.

There's two sets of this complete "Pacer" skateboarding kit – and that includes a skateboard (well, you'd look pretty silly trying to do it without one!), elbow pads, knee pads, helmet and hooded sweatshirt. Large people, however, should be aware that the helmet and protective gear are a little on the small size. And for ten unlucky losers there'll be an EA T-shirt – er, I mean one each: you won't be expected to share one between you!

Get your entries on a scenic postcard or the back of a sealed envelope before 31st August to: *AA's Gone Skateboarding,* Future Publishing, 4 Queen St, Bath BA1 1EJ.

And I suppose that's it. Is that all there is to it? Blimey, it's easy this... Oops! Hang on a minute, I forgot to tell you how to enter. I'll make it dead easy, if you've read the review. Just tell me who are the three guys who wrote the game... ●



Conditions of entry

1. Employees of Future Publishing Ltd and Electronic Arts and their relatives are not eligible to enter this competition. Sorry bro.
2. Entries, to be received before 31st August, become the property of Future Publishing.
3. Judges decision is final, and no correspondence will be entered into.
4. Entry implies acceptance of these rules.
5. We can't be held responsible if you win the competition, fall off the skateboard and brain yourself. Take care!

TYPE-INS

More nail-breaking typing practice with PAT McDONALD

COLOURDUMP

It had to happen sooner or later! **Jens Skinnerup** from Denmark has answered the cry for help from **Mrs RL Neal** of Romsey.

Mrs Neal asked for a program that would let her print out mode 0 screens in glorious technocolour on her **Star LC10 colour printer.**

The program (as written) produces perfect copies of *Smart II* pictures – **Robert Buckley's** *Smart II* being the art program included on the *AA*37 cover tape.

The filename in line **370** must be edited to the name of the picture, and the program does take a few hours to finish.

```
{ItAq} 100 'Star LC10 Colour Dump
{BvAq} 110 'By Jens Skinnerup
{IxAw} 120 'Amstrad Action August 1989
{LuBi} 170 DIM shade(26,2),
           inks(15),passes(26)
{NkAo} 180 FOR i=0 TO 26
{DrAm} 190 READ a
{NxAo} 200 FOR j=1 TO 2
{EjAq} 210 READ shade(i,j)
{OxAl} 220 NEXT j
{BjAl} 230 NEXT i
{CjAw} 240 DATA 0,0,0,1,2,2,2,2,2,3,5,0,4,3,3
{JqBj} 250 DATA 5,1,1,6,5,5,7,1,1,8,3,1,9,6,6
{FrBj} 260 DATA 10,0,7,11,2,7,12,4,0,13,0,7
{IjBj} 270 DATA 14,2,7,15,5,4,16,1,7,17,3,7
{NpBi} 280 DATA 18,6,6,19,6,6,20,0,7,21,6,7
{AqBk} 290 DATA 22,6,7,23,0,7,24,4,4,25,4,7
{LxAo} 300 DATA 26,7,7
{JqAp} 310 FOR i=0 TO 26
{EsAr} 320 READ passes(i)
{CuAk} 330 NEXT
{JiBj} 340 DATA 2,2,1,2,2,1,1,1,1,2,1,1,1,1
{PwBj} 350 DATA 1,1,1,1,1,1,1,1,1,1,1,1,1
{CxAr} 360 ' Load in picture
{XXXX} 370 MODE 0:MEMORY &3F00:LOAD "!"+
           "picture",&3F00
{OpAq} 380 CALL &BC06,&40
{InAp} 390 FOR f=0 TO 15
{LvAs} 400 INK f,PEEK(&3F00+f)
{LnAt} 410 inks(f)=PEEK(&3F00+f)
{JjAk} 420 NEXT f
{FjAt} 430 PLOT 0,398,0:PLOT 4,398
{AkAu} 440 ' Find colours not used
{HrAr} 450 FOR gink=1 TO 15
{DnAm} 460 used=0
{JjAt} 470 FOR x=0 TO 636 STEP 4
{DkAs} 480 FOR y=0 TO 398 STEP 2
{CwBm} 490 IF TEST(x,y)=gink
           THEN used=1:GOTO 520
{GtAk} 500 NEXT y
{CiAl} 510 NEXT x
{ClAx} 520 IF used=0 THEN inks(gink)=26
{DoAn} 530 NEXT gink
{HsAq} 540 ' Set up printer
{KlAm} 550 WIDTH 255
{MqBv} 560 PRINT #8,CHR$(27);"l";CHR$(5); ' Set
           left margin to 5
{FqBv} 570 PRINT #8,CHR$(27);"A";CHR$(4); ' Line
           spacing to 4/72 inch
{IrAo} 580 ' Main loop
{DqAr} 590 FOR gink=0 TO 15
{ItBi} 600 FOR pass1=1 TO passes(inks(gink))
{NsAn} 610 FOR pass=1 TO 2
{PpBn} 620 IF shade(inks(gink),pass)=7 THEN 770
{PlBv} 630 PRINT #8,CHR$(27);"r";CHR$(shade(inks
           (gink),pass)); ' Set colour
{AuAt} 640 FOR x=0 TO 636 STEP 4
{OnAo} 650 FOR s=0 TO 3
{OqCj} 660 PRINT #8,CHR$(27);"*";CHR$(0);"d";CHR$
           (0); ' Select single density
{OjAr} 670 FOR y=0 TO 99 STEP 2
{EjBs} 680 IF TEST(x,y+s*100)=gink THEN c1=80:c2=
           40 ELSE c1=0:c2=0
{NqBi} 690 IF pass=2 AND c1=80 THEN c1=40:c2=80
{NlAu} 700 PRINT #8,CHR$(c1);CHR$(c2);
{InAl} 710 NEXT y
{CuAp} 720 PRINT #8,"";
{CxAl} 730 NEXT s
{JlAm} 740 PRINT #8
{MnAl} 750 N    EXT x
{KqBq} 760 PRINT #8,CHR$(27);
           CHR$(12); ' Return to top of page
{GqAm} 770 NEXT pass
{FoAm} 780 NEXT pass1
{AwAn} 790 NEXT gink ●
```

If you don't know what those funny bits in brackets at the beginning of each line are for, look at *Type Writer* in *AA45*'s *Type Ins*. Hint: *you're not supposed to type them in!*

● By altering the following lines, any conventional 17K screen can be printed out. You must alter the DATA values in lines 410-430 to suit the screen ink values (as set out it's just white on black)

```
{NpAw} 370 MODE 0:LOAD "!"+"FILENAME",&C000
{KpBp} 380 FOR f=0 TO 15:READ inks(f):INK f,inks(f):NEXT f
{PqAw} 390 READ inks(f):INK f,inks(f)
{EpAl} 400 NEXT f
{HpAp} 410 DATA 0,26,0,0,0
{JqAo} 420 DATA 0,0,0,0,0
{LvAo} 430 DATA 0,0,0,0,0 ●
```

DISCOURSE IV

This month Hero's engine gets a demonstration at the capable hands of JAMES WILSON.

In 50 BC Egypt fell into the hands of the Roman Empire and the decline of Alexandria as a centre of intellectual innovation and excellence got well under way. But the great school still had a genius or two left from whom we inherit some useful algorithms.

In *Discourse II* Diophantus was mentioned in connection with his implicit use of the idea of a limit. Such a method was also used by Hero to estimate square roots of numbers which were not perfect squares.

Hero of Alexandria (ca.62 AD) was a practical man rather than a philosophical mathematician. In his book *Pneumatica* he describes the famous *Hero's Engine* whereby a small tank of water mounted on an axle is made to spin by heating the tank and allowing the steam to escape through two opposing holes – the first suggestion of a steam engine.

In his *Mechanica* he discusses gear trains, worm wheels, pulleys and levers in various combinations. His surveyor's *Dioptra* a form of theodolite, used screws and worm gears for fine adjustments.

Hero also advanced Euclid's optical work. He was the first to demonstrate the Law of Reflection of light – that the angle at which light is reflected from a surface is equal the angle at which it strikes – and he designed other surveying instruments which depended upon this.

He also investigated refraction and he mused on the effect of refraction on astronomical observations made near the horizon. But like the rest he also spent some time studying numbers.

The square roots of many integers are not only themselves not integers, but cannot even be represented properly and completely as a fraction.

For instance, 2, the square root of 4, can be equally well written as 2/1 or 36/18. However, SQR(2) cannot be represented as a fraction no matter how large the numerator (top number) or denominator (bottom number) and therefore is called an *irrational number*.

Hero developed an algorithm that makes it possible to create a fraction which is as close as we wish to get to the actual value of the square root of any integer.

The Heronian Algorithm depends on the fact that if we have any two numbers which, when multiplied together, form a third, then the average of these two numbers is closer to the square root of the third than either of them.

For example, 4 x 9 = 36. One could say that either 4 or 9 are approximations of SQR(36), but their average (6 1/2) is closer still. This is clearly true. If we can find a number n so that n x 6 1/2 = 36, then the average of n and 6 1/2 will be even closer still!

This number n is known as the inverse of the approximation (6 1/2 in this instance). By schoolboy algebra this must be 72/13.

Interestingly, the values of the approximation approach the square root from 'above', whereas the inverse approaches it from 'below', the two converging on the actual limiting value. The gap between them narrows quickly and the values of both the numerator and denominators of these fractions increase very rapidly.

For this reason, though we are dealing with integers, their values so quickly exceed 32676 that we have had to use Real numbers to represent them and, even then, after a couple of iterations we exceed the real top limit of 1.7E+38. This restriction of the CPC means the algorithm looses too much accuracy after about SQR (36) to be of real use, but is is a very fine example of a convergent algorithm. ●

● We apologise for the three errors that crept into June's *Discourse*.

x2 -p =y2 and thus p=x2-y2=(x=y)

should have read

x2 -p =y2 and thus p=x2-y2=(x+y) (x-y)

series is 2n=m wherem is 1,3,5... as the

should have read

series is 2n+m where m is 1,3,5... as the

and

from above, P=(x+y)(x-y),9271=123x73

should have read

from above, P=(x+y)(x-y),9271=127x73

Thanks to those readers who wrote or phoned to question or correct these errors!

● Keep tuned into *Discourse* next month, folks!

```
10 '*****************************************************
20 '*                                                   *
30 '*   James Wilson : Program No.4 : August 1988       *
40 '*                                                   *
50 '*****************************************************
60 DEFINT a,i,f:DEFREAL g-y:a=0:f=0:i=1:MODE 2
70 CLS:PRINT ±a, "HERO'S ALGORITHM
      TO APPROXIMATE THE SQUARE ROOT OF A NUMBER"
80 PRINT ±a:PRINT ±a
90 INPUT " Enter the number -";s
100 PRINT ±a,"
110 rn=s+1:rd=s
120 PRINT ±a,"Iteration No. = 1":GOTO 140
130 PRINT ±a,"               is"i
140                                   PRINT ±a,"Approximation    ="rn"/"rd
150 rin=rd*s:                         PRINT ±a,"Inverse          ="rin"/"rn
160 rmn=(rn^2) + (rd*rin):rmd=2*rn*rd:PRINT ±a,"Mean        ="rmn"/"rmd
170 rdd=rmd/2:                        PRINT ±a,"Difference  = 1/"rdd
180 rsn=rn:rn=rmn:rd=rmd:IF rd>1E+18 THEN GOTO 200
190 INPUT "Next Iteration";z$:IF UPPER$(z$)<>"N" THEN i=i+1:GOTO 130
200 PRINT ±a:PRINT ±a,"Current Approximation gives"rn/rd
210 PRINT ±a,"Current Inverse        gives"rin/rsn
220 PRINT ±a,"Amstrad's Algorithm  gives"SQR(s)
230 PRINT ±a,"Error against Amstrad is
   "( ( (rn/rd)-SQR(s) )*100)/SQR(s)"%":END ●
```

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3D SHAPE ROTATOR (F)	19
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E=educational, (F)=fun graphics, (G)=game, (P)=Standalone program, (R)=routine, (U)=Utility.

A few of these updates are corrections necessary to the smooth operation of the Type In.

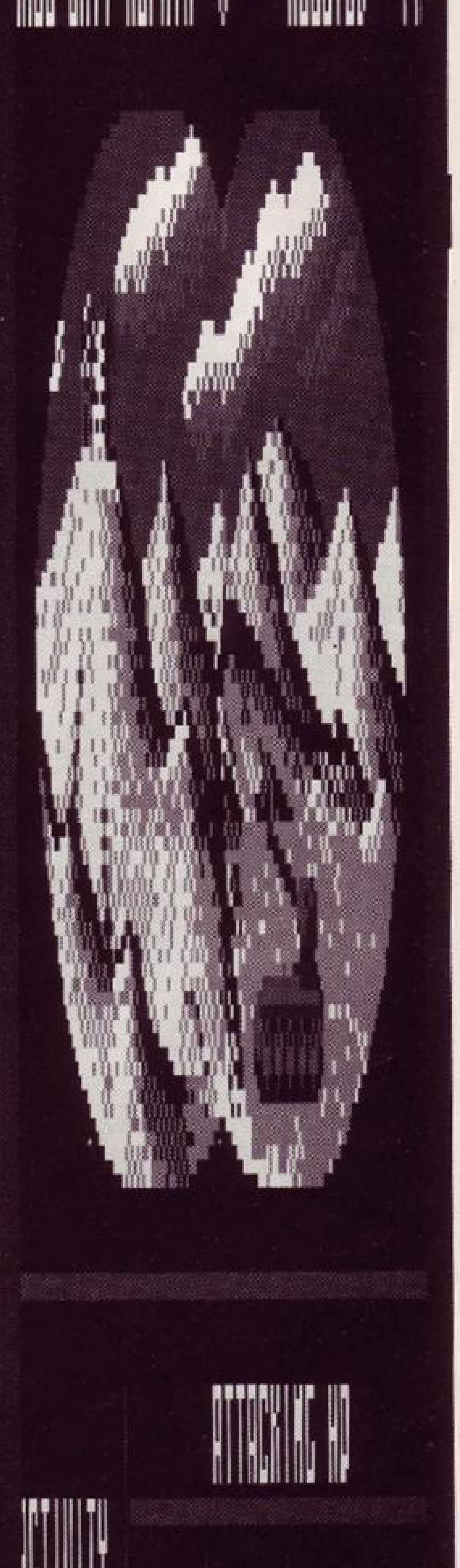
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● Thanks to the archivist extraordinaire who compiled this mammoth index. Your handsome reward, to the tune of £50 (sweet music indeed) awaits you. Unfortunately *(oh the embarrassment)* we've lost both your name and address...

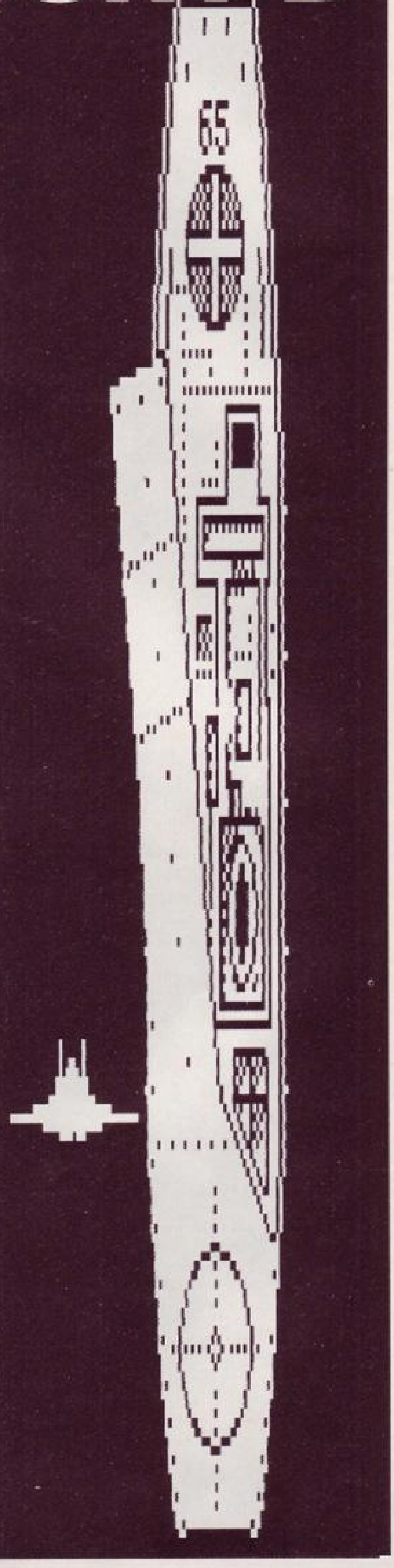
Well, look on the bright side: at least we're not responsible for transporting nuclear devices around the country. Which is just as well, really. Whoever you are, get in touch so we know where to send the moolah.

By the way, if anyone else is thinking of undertaking any kind of *AA* index, get in touch with us first. We'll tell you whether it's worth doing, and if so how we'd like it done.

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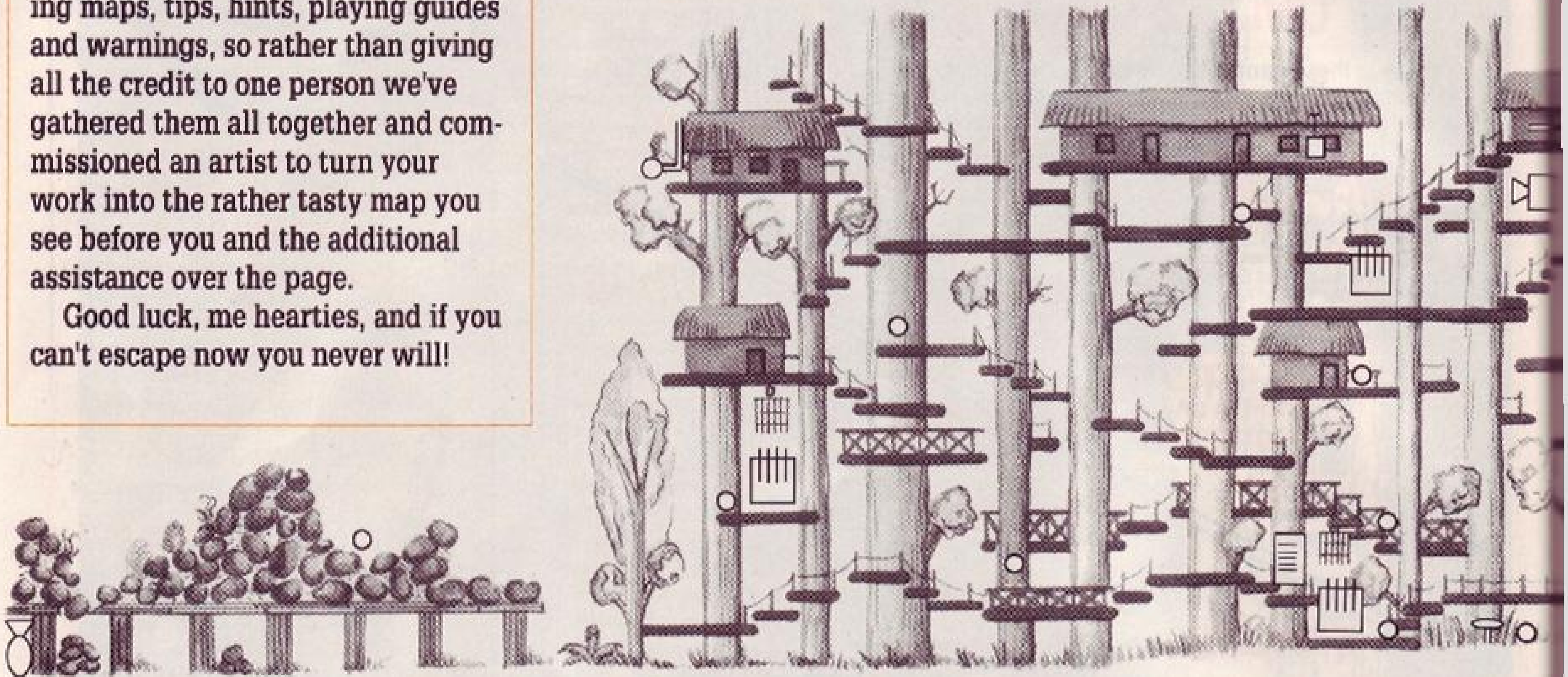
TYPE-INDEX CONT'D



If like us you'd spent many happy yet frustrating hours with the Oliver Twins' *Treasure Island Dizzy*, you'll appreciate some help. And here it is.

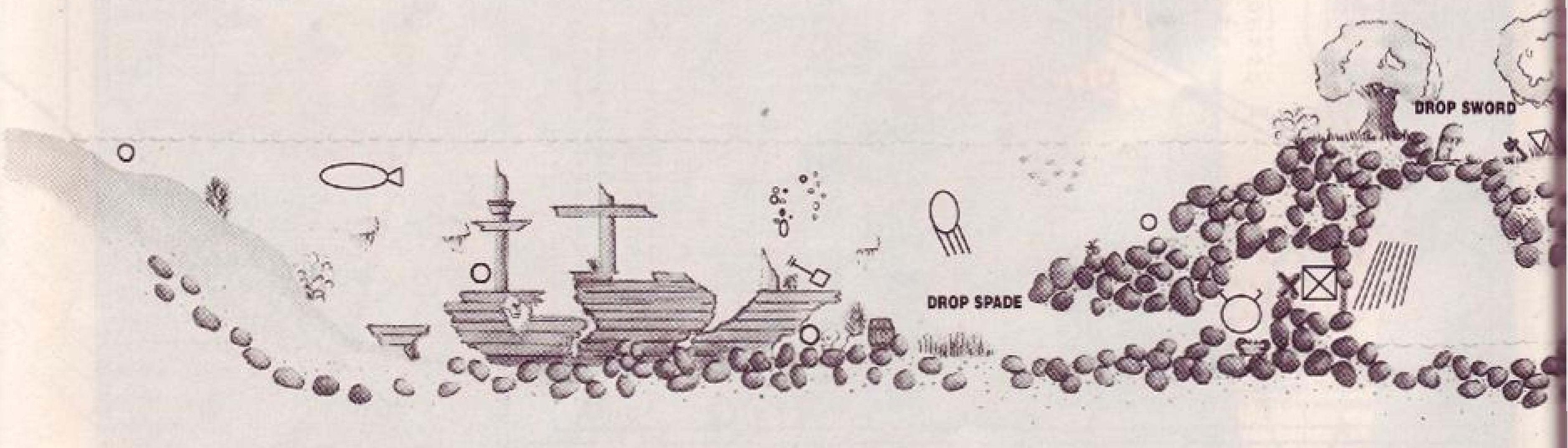
We've had dozens of letters offering maps, tips, hints, playing guides and warnings, so rather than giving all the credit to one person we've gathered them all together and commissioned an artist to turn your work into the rather tasty map you see before you and the additional assistance over the page.

Good luck, me hearties, and if you can't escape now you never will!



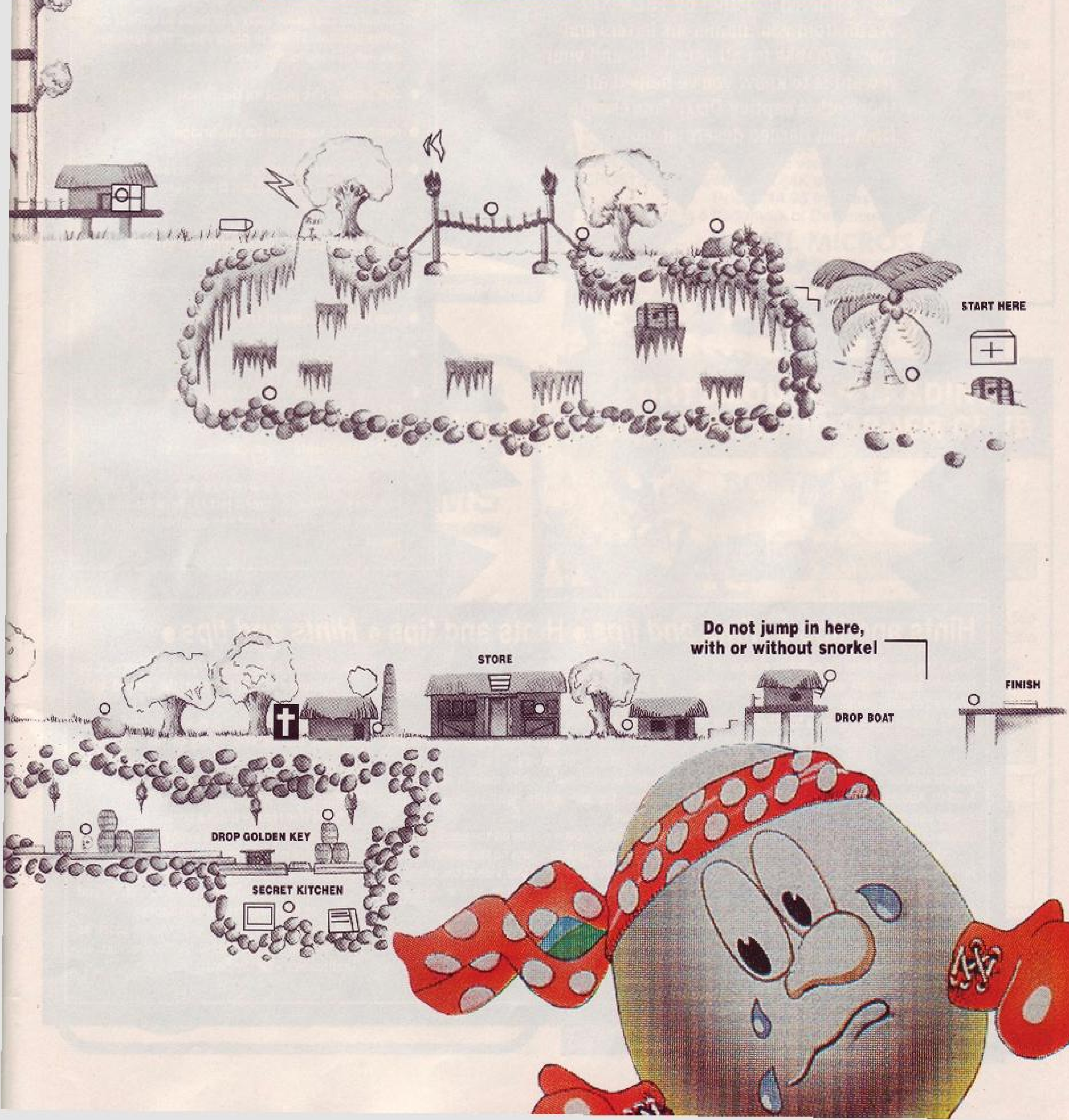
THE MAP

TREASURE ISLAND DIZZY



Artwork by Emma Collins

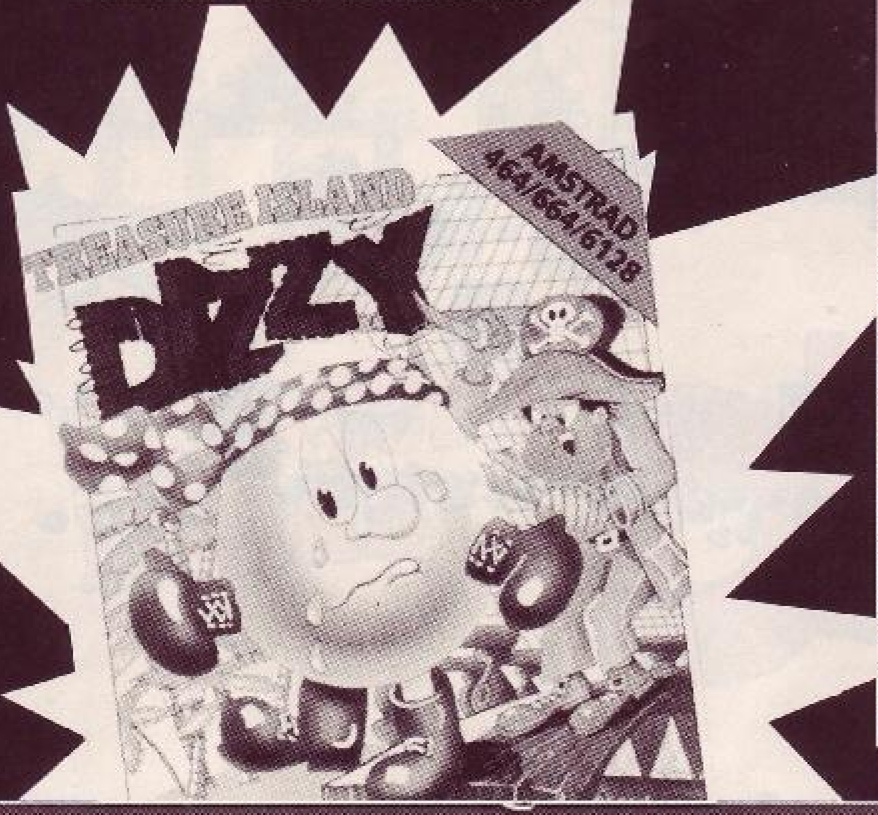

KEY
SNORKEL
ROCK
BAG OF GOLD
COIN (there are 30)
STEP
AXE
GLASS SWORD
BUCKET
TRAP
FIRE
SALT WATER
MUSHROOMS
VIDEO CAMERA
MICROWAVE
FISH
SINCLAIR ABUSER MAG
DYNAMITE
JELLYFISH
WINDOW
KEY
CRAB
TUBE OF TOOTHPASTE
SPADE
LIGHTNING BOLT WITH CURSED TREASURE
CHEST
DETONATOR
SCROLL
BIBLE
MAGIC WALL OF WATER


START HERE
Do not jump in here, with or without snorkel
STORE
DROP BOAT
FINISH
DROP GOLDEN KEY
SECRET KITCHEN

CHEAT MODE

Ooh aargh me hearties and all that nonsense – *Dizzy* tips galore!

Our indisp–, indesp–, in– er... our terrific *Desert Island Dizzy* guide continues with this collection of playing tips gathered together by TRENTON WEBB from your numerous letters and maps. Thanks for all your help, and your reward is to know you've helped all those other captive *Dizzy* fans escape from that darned desert island!



Riches beyond the dreams of wildest avarice, matey!

To complete the game fully you need to collect 30 coins in total. 17 are in plain view: the remainder are hidden as follows:

- one behind the plant on the beach
- one behind the plant on the bridge
- six in the tree house complex – including one behind the window of the tree house on the far right hand side
- one behind the mushrooms on the ground
- two behind parts of the wooden railings
- two behind pieces of tree trunk
- one by a plant above the mine
- one under the water, hidden behind the skull on the sea bed
- one in the pirate's cave under the skull
- finally near the shop there are two coins, one behind the rock to screen left of the store and a second on the right hand screen obscured by a plant

Hints and tips • *Hints and tips* • Hints and tips • *Hints and tips* •

Here's the major items for yolk folk who wish to become hard boiled adventurers and escape *Dizzy's Treasure Island.*

A bag of gold coins - give to the shopkeeper in exchange for the outboard motor for the boat.

Rubber snorkel – wear whenever underwater.

Sinclair Abuser Mag – drop in the water near the coin on the beach.

Sticks of dynamite – use to clear away the rocks in the mine that block your path.

Infra red detonator – use with the dynamite in the mine.

A sharp glass sword – use in the graveyard on the right hand side of the large lake. Drop the sword on the gravestone to open the entrance to the smugglers cave – *be sure to wear the snorkel!*

A small video camera – trade with the shopkeeper to get the Dehydrated boat.

A tube of toothpaste – *oo, er, um, ahm...*

Cursed treasure – give to the shopkeeper to get the boat's ignition key.

Empty solid chest – use to make a step to get over the hill on the right hand side of the beach.

A salt water spade – drop on the small moving rock underwater. Jump on the bubble it produces to get to the other side of the island.

The woodcutter's axe – drop on the centre of the bridge to get to the caves below.

A microwave oven – take to the storekeeper who will swap it for a gallon of petrol for the boat.

An old Holy Bible – stops you getting struck by lightning while carrying the cursed treasure.

An old empty bucket – give to the storekeeper.

A large golden key – take to the smugglers' caves and drop it on the half sunken barrel to gain access to the old kitchen.

A misty glass window – hides a coin.

A bit of tree trunk – hides a coin.

Wooden safety rail – hides a coin.

A clump of mushrooms – hides a coin.

Big red heavy rock – hiding place for a coin.

Dehydrated boat – drop in the water at the end of the quay, and a boat will appear.

Out board motor – drop in the same place as the boat and the boat will change colour.

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Insider dealing



Even though he was on holiday, sun-addled PHIL HOWARD still somehow managed to file the third part of his hacking series

So there I was, liloed out by the pool, sipping my Rondel Semi-Seco, and wondering what I could tell you about protection systems which would be useful and interesting, and yet at the same time not compromise the magazine's anti-piracy position, nor get myself into deep water. Meanwhile, in deep water, some teenage revellers were playing a ludicrous ball game and sending sprays of cold water down my bronzed (er, lobster pink) back. I never knew journalism was so tough.

Anyway, back to reality. Something that many systems use, and that is ideal for the protection of data, is one of computing's fundamental building blocks.

The logical operator, `XOR`, is widely used in the encryption of programs and program loaders. Not only is it one of the prime tools available to the protection writer, but it can also be used by the amateur to encode their own data and programs: so it is well worth looking at. To understand `XOR's` application it is necessary to have an idea of the way it works.

Boole's rush in

Mathematically (groan) it belongs to a system of symbolic logic known as Boolean Algebra. Formulated over 100 years ago, it was created to deal with digital calculations and manipulations.

It operates at binary level, and compares the individual bits from two numbers. Other




```
0574 CD D8 07                CALL 07D8H
0577 C1                      POP  BC
0578 10 B1                   DJNZ 052BH
057A 3E C8                   LD   A,0C8H
057C 32 19 0D                LD   (0D19H),A
057F C3 3E 04                JP   043EH
0582 3E 39                   LD   A,39H
0584 22 A3 06                LD   (06A3H),HL
0587 32 07 06                LD   (0607H),A
058A 3E B7                   LD   A,0B7H
058C 32 7F 0A                LD   (0A7FH),A
058F 21 FC 05                LD   HL,05FCH
0592 3E 30                   LD   A,30H
0594 06 08                   LD   B,8
0596 77            L0596:    LD   (HL),A
```

● The lives in *Space Harrier* are stored as an ASCII representation in memory location &0607. Nine lives=&39 ASCII and 57 decimal (try `PRINT CHR$(57)`)

Extracting Black Box pokes

More and more these days Black Boxes are becoming *the* hacking/copying utilities.

One drawback, however, as far as the beginner is concerned, is that once transferred onto disk, cheat routines published in *Cheat Mode* are no longer useable.

You can use the cheat to load a tape game, and then save the whole lot with the poke in place to disk, but this means two disk copies a heck of a lot of wasted disk space.

What you need are the poke numbers and the addresses which need altering (see the 'Black Box' pokes often featured in *Cheat Mode*). These can then be put into the game once it has loaded.

Now there is a snag, as there always is. Cheat routines load the program from tape/disk, insert the poke, and then jump into the game, and they are written to work on the code in its initial location.

If a Black Box is used to stop a program while it is running, the code may have been shuffled about.

If it has, then the poke won't work. Still, there's no harm in trying. If you look at the *Cheat Mode* pages you'll find that there are basically two types of routine.

The first type are mostly Basic (and are often disk pokes). They set the colours, load the code, poke the alterations in, and normally take the place of the loader itself: an example is the *Arctic Fox* poke by Tony Jones in AA40 (poke &A300, 0). The poke is &00 and the address is &A300: this can be used directly as a Black Box poke.

The second type usually has a lump of m/c code in the form of a few data lines, used to deprotect the loader and then poke the alteration in. Generally most of this code is merely for deprotection and is of no use here.

The other part is the actual poke and is mostly only a few bytes long. Thankfully routines are usually written logically, with the deprotector first followed by the poke, followed by a jump into the game.

If they are documented, such as the *Dark Side* poke by Mike Wong in *AA45*, so much the better.

If not, then begin by looking at the last couple of data lines. Usually the sequence `&3E, XX (ld A,poke) - &32,XX,XX (ld location XXXX,A)` is used to change single bytes.

The number after the &3E is the poke and the number after the &32 is the address – and you must remember to reverse it! An example is *Robocop* in *AA43*, where `3E,C9,32,F2,3E - POKE &C9` into ADDRESS &3EF2.



● Romantic Robot's controversial *Multiface* device – hardly the pirate's pal, but certainly the hacker's helpmate!

To save on space, programmers often use the single byte instruction &AF `(xor A)` in place of the two byte instruction `&3E,&00 (ld A,00)`. It has the same effect – ie *Uridium*, by Peter Featherstone in *AA41*.

Finally remember that there may well be more than one poke per game, such as in *Tanium* by Graham Smith in *AA40*

Desperate for a poke? Try this!

You may recall from last month that the first type of system you might come across to decrease the number of lives/energy/time uses the "A" register, which loads a memory location with the amount of lives at the start of the game.

It then reduces that number, again using the "A" register, when a life is lost, by loading A,(LIVES) - decreasing A - and loading (LIVES),A. The second type is very nearly the same, except that it has one or two subtle differences that make it more difficult to detect (wouldn't you know it, you learn the rules and then they get changed).

What you find is that there are a number of programs, perhaps one in five, that work like this. They either load the lives into a memory location using &3E - &03 (say), followed by &32,XX,XX (as before) but then decrease the amount using a different method.

Alternatively, they decrease the lives using &3D (as before) but load the number into the memory location at the start differently. (Who said this stuff was confusing?!)

So, what do you look for? Well, if you can find the location where the lives are stored there are only a limited number of ways that they can be decreased.

One method uses the HL register pair, which points to and decreases the memory location holding the lives. The instruction &21 XX XX (ld HL,XX XX) tells HL the 1memory location to look at, and then &35 (dec(memory location in HL)) decreases that memory location by one.

This acts without lifting the number out and then putting it back. It's faster, but must be accompanied by a separate routine to check if lives have run out. In this case replace &35 with &00.

A second, slightly rarer method, is to decrease the lives using &D6 &01 (sub 01), which takes 1 away from the A register, using a sequence similar to &3D (dec A). This method is often used to count down clocks or timers. Change &01 to &00 making it &D6,&00 (sub 00).

A few others like &0E (dec C), &05 (dec B), or even &2B (dec HL) can, and are, used very occasionally.

However, as the number of lives is generally small you would expect their manipulation to be in single byte registers, and, because "A" is the main single byte register affecting the flags, its use is generally favoured somewhere along the way.

Finding the place where the lives are stored initially is generally the difficult bit, and it's true to say that once found the rest is fairly straightforward.

We shall discuss this further next month. Meanwhile a few things which might prove useful are:

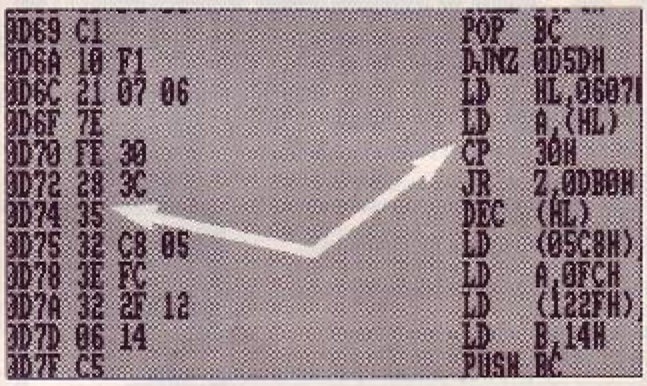
- Always check for one more, and one fewer lives than are displayed, just in case the life checking system operates differently from usual.
- And if the lives are displayed numerically, it's worth looking for the numbers' ASCII representation (ie. &3E,&33 (ld A,&33) for 3 lives), which is done so that the number can be displayed directly on the screen.

Without the lives' location things start to look black, since the program will be full of &3Ds, performing all sorts of functions.

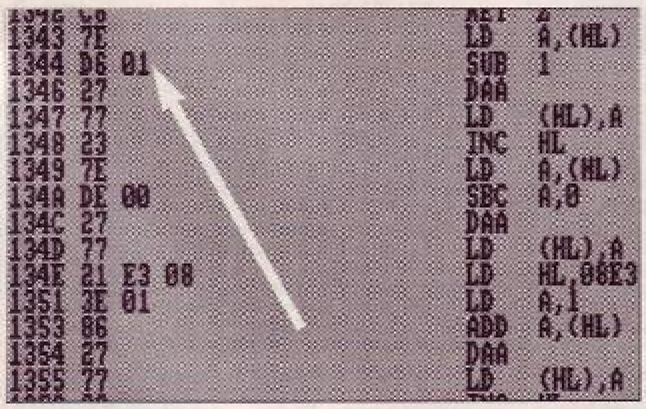
It is possible, in the last resort, to use the byte search, to go through the entire program selecting likely sequences of &32,XX,XX - &3D - &32,XX,XX, and then running the game with one &3D replaced by &00 or &A7 just to see what it does.

This, however, needless to say, is best reserved for desperate cases!

Try everything else you know first, or it could be a very long night! If you do find yourself trying this method, however, keep track of which part of the game is affected.



● *(Space Harrier again)* Lives are decreased using &35 (dec(HL)) at &80D74. Note that the program is forced to check for the number reaching &30 rather than zero at &0D70



● This one's from *WEC Le Mans*. The HL register is loaded with the memory location &08F2, then &D6, &01 (sub &01) at &1344 is used to count down the timer

operators performing similar functions are AND, OR, NOT and so on (for a summary of these see *Inside Out* in *AA45*). The operations performed by all of these are implemented in Locomotive Basic, so you can experiment with them without having to resort to m/c code. The CPC User Manual does attempt an explanation, but, predictably, leaves XOR vague.

XOR (=Exclusive Or) compares the corresponding bits of two numbers and produces a third number comprising of the resultant bits. There are three possible outcomes from the operation:

1) The resultant bit is 1 if either of the initial bits is 1 (either one or the other);
2) but is 0 if both bits are 1;
3) and is 0 if both bits are 0.

The difference between OR and XOR is that XOR is exclusive of both bits being 1 (one *and* the other).

Normally we are used to dealing with 8 bit numbers (0-255). The process is carried out by comparing each of the 8 bits of the two numbers, forming a third 8 bit number.

What, though, has all this got to do with de-coding protection systems? Well, when a number is XORed with a second, the elements of both are locked up in a third newly created number. Then at some later date the first number can be unlocked by XORing the third once again with the second number (shades of ENIGMA, code-breaking fans!). If you run through a program (which is after all a series of numbers) XORing each number with, say your age, house number, birthday, whatever, the resultant bunch of coded numbers will be meaningless until re- XORed with that same number.

But there's more (oh dear). This is just the start of a 101 ways to implement the feature. Suppose you take your block of code (series of numbers) and your birthday. You XOR the first number with your birthday to create a new number, then instead of using your birthday to XOR the second, you use the result of the first XOR. Then on the third, you use the result from the second XOR, and so on until the end.

Now you have an infinitely more sophisticated system, something like the type used in protections. This sequential method has the advantage that if one number along the way is altered before decoding, then everything from that point will be wrong.

Confused? Ah well, back to the pool, now where's that sun-cream gone...? ●

Stay tuned for more Hacking secrets in next month's *Insider Dealing*, featuring Phil's amusing sun-tan

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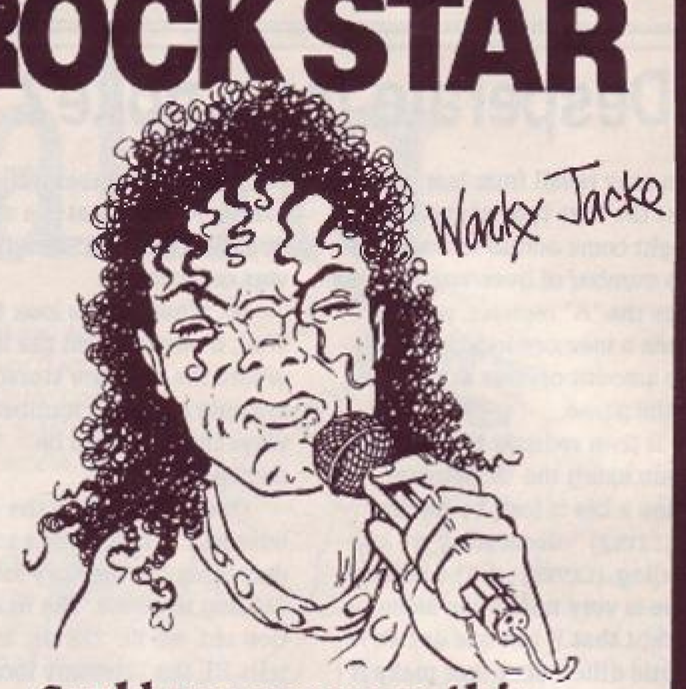
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Logotron ☎ 0223 323656
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Protext

Arnor ☎ 0733 68909
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Lightning fast on all tasks involving screen. True merging from separate files and disks to the cursor position is easy, and *Protext* supports standard CPC RSX's like DISC, TAPE, CAT etc. ROM version is excellent. Bad points: maximum file space limited to machine memory – about 22K on disk, 38K for the ROM version. As used by *AA*, if that's any recommendation (don't answer that).

Pyraword

Discovery ☎ 0742 753423
£14.95 tape, £17.95 disk ● *AA18*
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Tasword

Tasman Software ● 0532 4388301
464, 464D, 6128 ● £19.95 tape/£24.95 disk ● *AA1*
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Wordstar

Micropro/Cumana ☎ 0483 571666 £49.95 disk only (CPM) ● *AA1*
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Amstrad ☎ 0277 230222
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Amstrad DMP3160

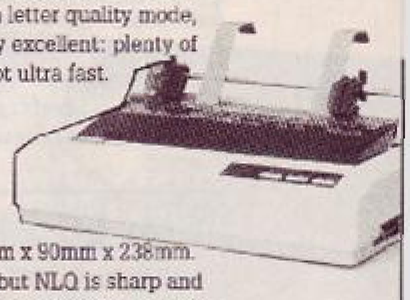
Amstrad
£228.85 ● *AA29*
Similar to but faster than DMP2160. Accepts all IBM and Epson printing codes. NLQ is front loading system. Good buy.

Amstrad DMP4000

☎ 0277 230222
£401.35 ● *AA20*
A real text cruncher. Wide carriage, and really flies across the paper, up to about 200 cps (in NLQ about 50 cps). Fonts available: standard 9 pin Pica, Elite, condensed etc. – but they are different, rather than just adjusted spacing for the same characters.

Amstrad LQ3500

☎ 0277 230222
£401.35 rrp ● AA31
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Citizen 120D

Citizen ☎ 0800 282692
£159 ● *AA43*
Dimensions: 3.7 kgs, and 370mm x 90mm x 238mm. Draft quality is 'dott,' and poor, but NLQ is sharp and simple. A quiet beast, with cable to the computer connected on the side. Manual includes a complete written breakdown of all the printer control commands, and their effects.

Epson LX800

Epson ☎ 01 902 8892
£320.85 ● AA29
Very fast for 9 pin. Control panel for style selection, and Epson compatible. Reverse winding sheets requires care, though.

Epson EX800

☎ 01 902 8892
£458.85 ● *AA29*
Upgradable in 101 ways – cut sheet feeds, serial ports, longer life ribbons. Quiet, with respectable printing speed. Sans Serif/Roman NLQ fonts incorporated. Control panel to select fonts – just the same font with different spacings.

Epson LQ500

Epson ● £803 rrp ● *AA29*
Features galore and price to match. Handles both Sans Serif and Roman styles of NLQ, for instance. Colour-printing upgrade kit available. 24 pin printer, offering excellent quality printing. Control panel to select from many available fonts (ie. the same font at different widths).

Panasonic KXP3131U

Panasonic ☎ 0753 73181 ● £335.25 (discont.) ● *AA29*
Daisywheel therefore superb quality – but can't print bit graphics (no trendy screen dumps), and if you want

different fonts, you have to plug in a different Diablo-compatible one. Not quiet.

Mannesmann Tally MT81

Mannesmann Tally ☎ 0734 788711 ● £149 ● *AA43*

Dimensions: 70mm X 100mm X 265mm; weight, 4.5 kgs. Draft quality is 'dott,' and poor, but NLQ is sharp and simple. Prints Epson and IBM graphics. Draft mode print quality is good: square printhead pins put ink onto greater areas. The printed output is more ornate than the Citizen. Manual is superb, but falls down in failing to explain control codes: for that you have to buy the applications manual. Certainly a very good buy.

Panasonic KXP1081

Panasonic ● £245 rrp ● AA29

Similar to DMP2000/2160: chunky, 9 pins, 10 inch carriage and compatible with Epson codes. Thorough A4 manual, good NLQ mode – better than DMP – and condensed, draft and NLQ modes.

Star LC-10

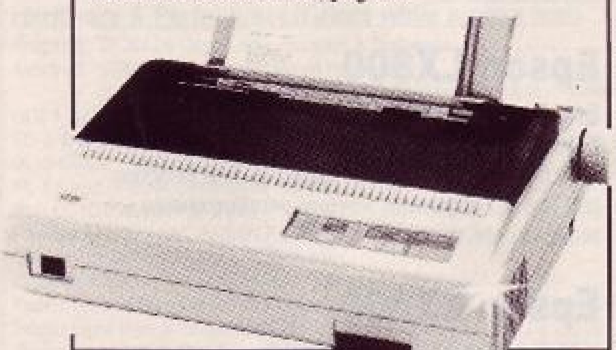
Star ☎ 01 840 1800 ● £263.35/£343.85 rrp ● AA32

First price is for standard dot matrix printer. Fonts selected by button, rather than typing in fiddly control code. Second price is for relatively inexpensive colour model. Uses multi-colour ribbon to produce different mixes, though there are currently no commercial programs to take advantage of this capability *(but see the Colourdump review in this issue, page 24).*

Star LC 24-10

£458.85 rrp ● AA47

A low-cost 24 pin, 10 inch, 80 column Letter Quality printer: 8 resident fonts, all operable from the front control panel and 3 print variations. See the review in this issue, page 22.



INTEGRATED PACKAGES

Info-Script

Brunning ☎ 0245 252854
£46 disk only ● 128K/256K only ● *AA35*

Billed as the 'complete database with word-processor and spelling checker', it's best with 256K. Well set up, easy to use and allows for changes in layout and content. Manual could be clearer.

Protext Filer/Office

Arnor ☎ 0733 68909
£24.95/£34.95 disk only ● *AA34*

Database that works comfortably with *Protext*, has powerful sorting options and comprehensive invoice printer. Can be slow, but good value.

Mini Office II

Database ☎ 051 357 2961
£14.95 tape, £19.95 disk ● *AA6*

Astonishingly cheap word processor, database, spreadsheet, graphics, comms and label printer all-in-one, it's continued to sell, and sell, and sell... Not full specification, but at this price who's complaining?



EDUCATIONAL PROGRAMS

Amstrad Selection

Fernleaf Education ☎ 0474 359037
£12.50 tape, £17.50 disk ● *AA32*

For age range 7 to 12+: seven programs – *Fletcher's Castle, Market Stall, The Perfume Hunter, The Raiders, Ferry Captain, Treasure,* and *Thorn Sea.*

Arc Master Pack

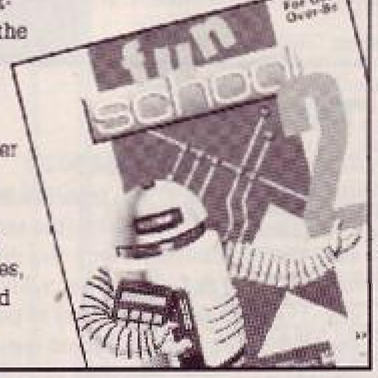
Arc Education ☎ 0472 812226
£48 disk ● *AA32*

A massive pack of 70 programs: Junior; Primary; a parent/child adventure; DR Logo and word games. Each set available at £9 tape and £12 disk. Well presented with good graphics, reasonable musical ditties and plenty of options.

Funschool 2

Database Software ☎ 0625 878888 ● *AA43*

So rare is it that educational software gets into the charts that it made the news pages of the weekly computer press. Actually there are three great packages here: under sixes, six to eights and over eights.



Kosmos

Kosmos ☎ 05255 3942 ● £9.95/£13.95 ● *AA32*

Answer Back Junior Quiz lets you either answer the question; make a choice from a number of options; or say whether something is true or false. There's also *Factfile 500*, sets of additional questions for the program: arithmetic, spelling, sport and natural history.

The other range from Kosmos: vocabulary tutors in French, Spanish, German and Italian.

Wordhang

Bourne Education ☎ 0794 523301
£9.95 cassette; £14.95 ● *AA32*

One of Bourne's range of ten programs. Others include *Happy Letters, Numbers* and *Writing* (all Infant); *Timeman One/Two* and *Map Rally* (all Junior); and the excellent *Chemistry* and *Physics Revision* (Senior).

● *See also* Pendown *in* 'Word Processing'

BUSINESS/ ACCOUNTS

Protext Office

Arnor ☎ 0733 68909
£34.95 ● CPM+, 6128 only ● *AA34*

Requires *Protext* and *Promerge* to run. Information inputted using *Protext*. Mail merge templates included, and very well implemented invoice printing feature. A genuinely useful business system.

SD Microsystems range

☎ 0462 675106
General Ledger ● £19.95 ● *AA32*
Sales Invoicer Pack ● £14.95 ● *AA26*
Small Traders Pack ● £24.95 ● *AA26*
Stock Control ● £39.95 ● CPM+, 6128 only ● *AA32*

SD Microsystems have a range of quality small business systems. Consult original reviews for in-depth explanations of what each does and how it differs from the others – or better still, ring them and ask.

DATABASES

AtLast Plus

Rational Solutions ☎ 056681 511
£39.95 ● CPM+, 6128 only ● *AA30*

Powerful: developed into users requirements. Data capacity restricted only by disk size, and splitting fields into smaller elements possible. Printed output impressive. Beefy processing.

Masterfile III

Campbell systems ☎ 0378 77762
£39.95 CPM+ ● *AA30*

With parent/child records – enabling tying together of records, saving space and time. Screen layouts and reports menu selected; not for faint hearts, but good results.

Random Access Database

Minerva Systems ☎ 0392 37756
£29.95 disk only ● reviewed *AA6*

40 or 80 column screen. Good mathematical and string operations . Random disk accessing gives speed and power.

● *See also Info-Script in '4. Integrated Packages'*

SPREADSHEETS

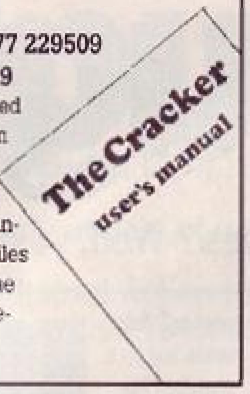
Mastercalc 128

Cambpell Systems ☎ 0378 77762
£33 disk ● 128K machines ● *AA4*

Can show two parts of spreadsheet at once. Includes notepad and calculator. Easy to use, but the mathematical formulae can only consist of the four basic arithmetic options. Slows down as more data is entered.

Cracker

Newstar Software ☎ 0277 229509
£49.95 disk CPM+ ● *AA9*
Spreadsheets must be created from scratch. Documentation good, command sequences soon learned. Mathematical functions well done, with random numbers catered for. Files limited to 17K – and formulae programming not well implemented.



Matrix

Audiogenic Software ☎ 0734 303663
£34.95 disk ● *AA18*
Uses disk to store data – so good capacity on the plus side, but poor speed on the minus side. Graphic options excellent. Onscreen prompts rare, making it hard at first. Calculating power good.

Supercalc II

Amsoft/Sorcim ☎ 0277 230222
£49.95 CPM+ ● *AA4*
First class documentation. Calculations can be determinative – performed on whether or not cell's contents match given value. Excellent help prompts and arithmetic functions.

SOUND

Amdrum

Cheetah ☎ 0222 555525
£34.95 ● *AA13*
Digital drum machine. Editor comprehensive. Not Midi compatible: to hear output you plug it into amplifier.

DHCP Midi Interface

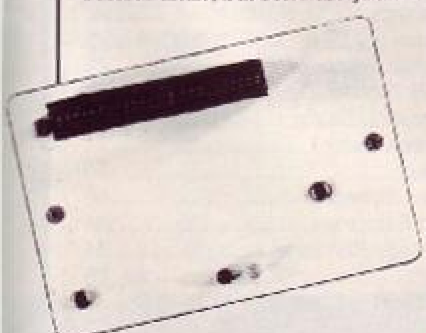
DHCP ☎ 0440 61207
£69.95 interface, £34.95+ disk s'ware ● *AA33*
DHCP produce Midi software for various Midi interfaces for CPC, which are incompatible with each other.

Micro Music Creator

First Byte Software ☎ 0225 765086
£14.95 disk, £24.95 ROM ● *AA38*
A music composer that lets you put staves and notes onscreen and play tune back. Accents can't be inserted, though. Other side is sampler to capture sounds from tape and play them through CPC. Excellent.

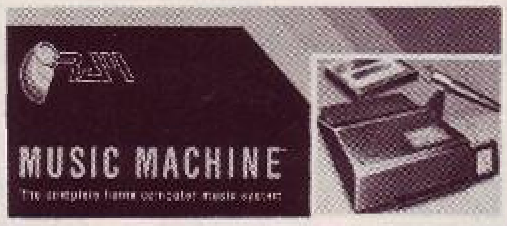
Midi Interface

Silicon Systems ☎ 061 848 8959
£59.95 interface, £59.95 software ● *AA26*
Useless alone, but software you can use with it – DX7, FB01, MT32, D50 and CZ101 – is diverse. Software prices vary, and lack presentation of EMR sequencer. High performance.



Ram Music Machine

RAM Electronics ☎ 0252 850085
£49.95 disk, £59.95 disk ● *AA17*
All in one music package: Midi interface, sound sampler and music editor. Sampler can handle one sample of just over a second. Midi controller software and music editor comprehensive. No through port, though, so 464 users must use tape version. And you can't edit live played Midi compositions.



Miditrack Performer

EMR ☎ 0702 335747
£92.50 cass/disk ● *AA13*
Midi interface plus sequencing software to drive Midi equipped instruments. Records each instrument then plays them all at once. Onscreen layout similar to multi-track recorder. Excellent.

Sound Blaster

Siren Software ☎ 061 848 8959
£29.99 ● *AA23*
Amplifier and pair of loudspeakers that plug into CPC for maximum 2 watts sound effects.

Speech Synthesizer

DK/RAM Electronics ☎ 0252 850085
£35, £40 ROM
Add-on producing speech by RSX's: loudspeakers supplied. Cannot include speech in program for someone else's CPC, though. Even so, excellent speech quality and value.

VISION

Advanced Art Studio

EEC ☎ 0753 888866
£24.95 disk ● *AA21*
Recently revitalised, this is *the* user-friendly, best and most powerful art package: works in all three modes. Can cycle through inks, and cut and paste different areas, transformations and reflections. Fill routines in coloured patterns. Available as a standard version for £15.95.



AMX Art

Advanced Memory Systems ☎ 0925 413501
£69.95 disk only (includes mouse) ● *AA7*
User friendly, if little unsophisticated compared to *Advanced Art Studio*, but mouse helps greatly. Colour, spraycans, textures, circles and host of other features.

Cherry Paint

Siren Software ☎ 061 228 1831
£9.99 disk only ● *AA20*
WIMP controlled – ie mouse moves pointer to various icons to pull-down menus. B/W mode 2 only, but fun. Curves are difficult, but this is a bargain.

CRL Image System

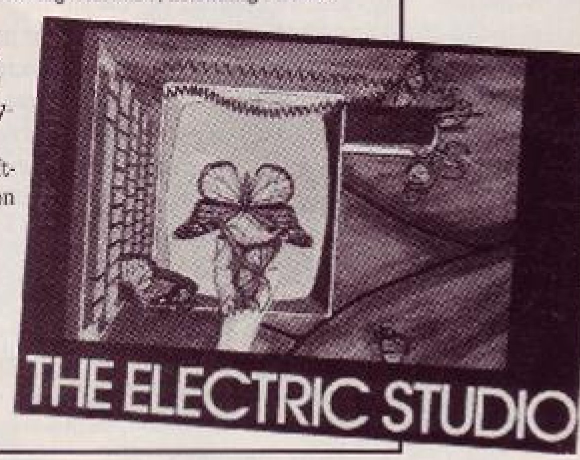
CRL ☎ 01 533 2918
£14.95 disk/tape ● *AA12*
Boasts range of picture manipulations and distortions, but lacks art options. Best on finished pictures – like a mini Quantel box.

DART Scanner

Dart Electronics ☎ 0502 513707
£79.95 ● *AA22*
Attach reading device to your DMP2000, 3000 or 3160. Feed in picture to printer: device reads in picture as B/W image. Quality onscreen isn't amazing, but it works and it's fun.

Electric Studio Light Pen

Electric Studio ☎ 0462 420222
£19.95 tape, £29.95 disk ● *AA1*
Excellent drawing software, including rubber-banding shapes and lines, filling areas, spray-can etc. Accepts software written for it.



The Informer

Treasure Island Software ☎ 0492 593549
£29 disk only ● *AA33*
For creating animated displays, suitable for classroom and shop window: takes text, graphics and animated displays and produces slide show. Works best but not only with *Parrotry Plus* (see below).

Parrotry Plus

Treasure Island Software ☎ 0492 593549 ●
£19.95 disk only ● *AA30*
Rather than lots of effects used anywhere and at any time, *Parrotry Plus* 'remembers' every alteration and plays through the list to create animation. Note: can't dump pictures to printer without external program.

Vidi Digitizer

Rombo Productions ☎ 0506 39046
£89.95 ● *AA15*
Grabs picture from video recorder or camera and puts it on CPC screen, allowing you to alter it with an package. Easy to use. Software on tape, disk or ROM includes superb printer dump routine. ●

● Corrections, additions or ideas for sections you think should be here are very welcome. Drop a line to: *AA Buyers, Amstrad Action*, 4 Queen St, Bath BA1 1EJ

You mustn't miss *AA*'s scorching hot and still steaming September issue out on Thursday 10th August!

AAfterthought

Is it a bird? Is it that corny old headline everyone always uses? Well, yes it is actually

A while back, eagle-eyed readers will recall, we were privileged to review Microprose's *Airborne Ranger.* It merited a massive 90% on the old *AA* Ratingsometer. And to celebrate we teamed up with the Tetbury terrors to bring you the chance to win a day out to remember – including a flight in the Microprose Piper Cherokee!



● Lucky prizewinner Krystyna and friend Carl, together with ashen-faced ed, adding up the typos from a recent issue (45 and counting)

Tons of entries flooded in, and when the time came first out of the *AA* competition dustbin was KRYSTYNA GIBBONS from Bargoed. She brought CARL HARRISON with her – who by a strange but genuine coincidence was the author of the prize-winning letter in *Reaction* last month. Microprose PR person Martin Moth, 23 (young, free and single *and you can see why*), took them around HQ and allowed them to plunder the massive warehouse (just wait till



● I hope Carey's better at these controls than he is at *Airborne Ranger*

Wild Bill hears about that). Staggering under the weight of every CPC game Microprose have ever done (*Soccer, 3D Pool* (see this issue), *Gunship, Times of Lore* and many more), t-shirts, mugs and



posters they were led to a waiting car and chauffeuse Clare Gardener (who took these pictures too, by *the way*) to be driven off to G-OMPS, the Microprose Piper Cherokee. Neither was the petrified ed allowed to get away...



● Krystyna and Carl, keeping their heads when all about them are losing theirs

After a flight that took in some spectacular and lunch repeating views of Bath, Home of the Stars (and also of *AA*), Krystyna said that it had been "Terrific. Everyone at Microprose was really great and went out of their way to be helpful." And the flight? "Spectacular view, but I'm not keen to repeat the experience soon!"

Still using that boring old cowboy picture? Yup!

To the newsagent: Amstrad Action is distributed by COMAG

Dear newsagent,
Please reserve me a copy of the fabbo September *Amstrad Action*, due out on Thursday 10 August

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Address:

Telephone number:
If you're under 16, please get your parent or guardian to sign here:



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That's right, sole fans! Now's your chance to cut down on the old footslogging by taking out a subscription to your favourite read – and while you're at it, why not subscribe to *AA*, too?

Let your fingers do the walking back to page 29 for this wonderful opportunity. And remember, an *AA* in the postbox is worth two in the newsagent's!

ADVERTISERS INDEX

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- Get your quarterly update of extra special savings on goodies
- Subscribe to Amstrad Action for £17.95 and you will receive 12 issues plus £20 worth of vouchers

See page 74 for details of our Voucher scheme.

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Just £3.99

The amazing AA T-shirt is here! The sparky red and blue AA logo is printed on a white cotton T-shirt which you can buy for £4.99 in either medium or extra large sizes. Get this and you'll have AA even nearer your heart than ever before!

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A361 (medium)
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Three for £1.50

For bringing out those key phrases, there's nothing like these AA-embossed pens in red, yellow and green.

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2-piece set only £6.95

A set of dust covers provides a neat solution to dust, tea and other potential computer disasters.

These specially-commissioned Amstrad Action covers are made from high-quality, water (and coffee) proof PVC. They're coloured a gentle beige with smart blue trimming and matching AA logo.

You can order a 2-piece set tailor-made for your CPC system – just choose the correct order code from the list below.

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464 colour -	A209	6128 mono -	A212
664 mono -	A210	6128 colour -	A213

AA BINDERS

Just £4.95 each

The fabbo AA binder is the ideal item in which to store your growing collection of the world's most popular CPC magazine! Holds 12 issues, this royal blue binder with gold embossed logo on side and front is an essential purchase for even half-serious readers.

Order Code AA217
(Or buy two for £9.00
Order Code AA2172)

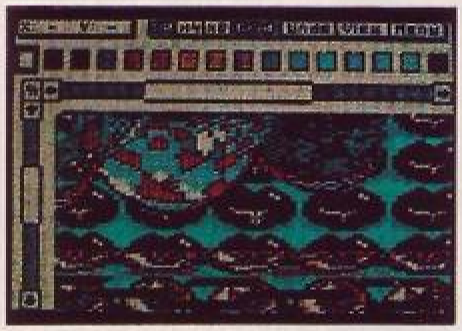
AA Back Issues are just £1.25! or £1.50! See page 74 for details

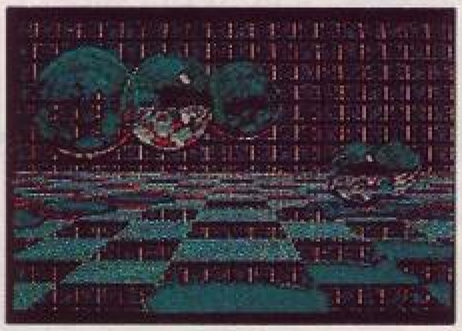
➤ ➤ ➤ ➤ ➤ ➤ ➤ ➤ ➤ See over page for order form

THE ADVANCED OCP ART STUDIO ● From EEC

RRP £24.95 AA Price £19.95

For CPC6128 users (or 464 users with disc drive and 64 rampak)

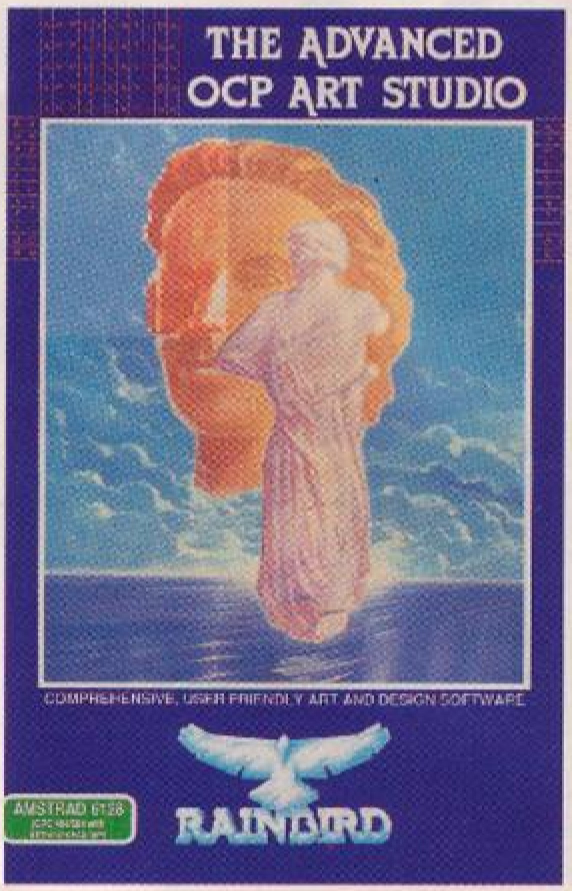




The ultimate in computer art and design for your CPC — no budding artist should be without. Operates from mouse, keyboard or joystick control. Includes 16 drawing pens, 8 random spray cans and 15 user-definable brushes.

- Three levels of magnification with pixel edit, pan and zoom
- Full range of colours
- Windows can be cleared, inverted, cut and pasted, enlarged, reduced, squashed, stretched, flipped and rotated.
- Full-feature font editor allows the design of complete character sets

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Please remember the post-code, it is essential!

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MONEY MANAGER

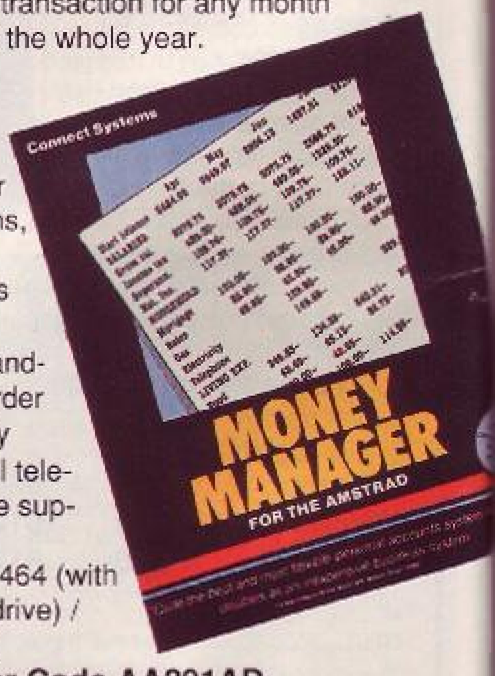
● From Connect Systems

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Money Manager is an easy-to-use system for recording all financial transactions, and for analysing them in a number of very powerful ways in order to facilitate sound financial management. Ideal for controlling small businesses, or for users wishing to control their personal finances in a business like way.

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CPC 464 (with disk drive) / 6128



Order Code AA291AD

HOW TO ORDER

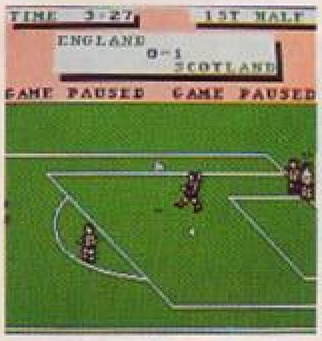
Just fill in the order form above and use the order numbers listed with the product, Or phone us with your credit card details on 0458 74192 (24-hour answerphone).

EMLYN HUGHES INTERNATIONAL SOCCER

● From Audiogenic

AmsCass RRP £9.95 AA Price £6.95 Order Code AA233AC
AmsDis RRP £14.95 AA Price £9.95 Order Code AA233AD

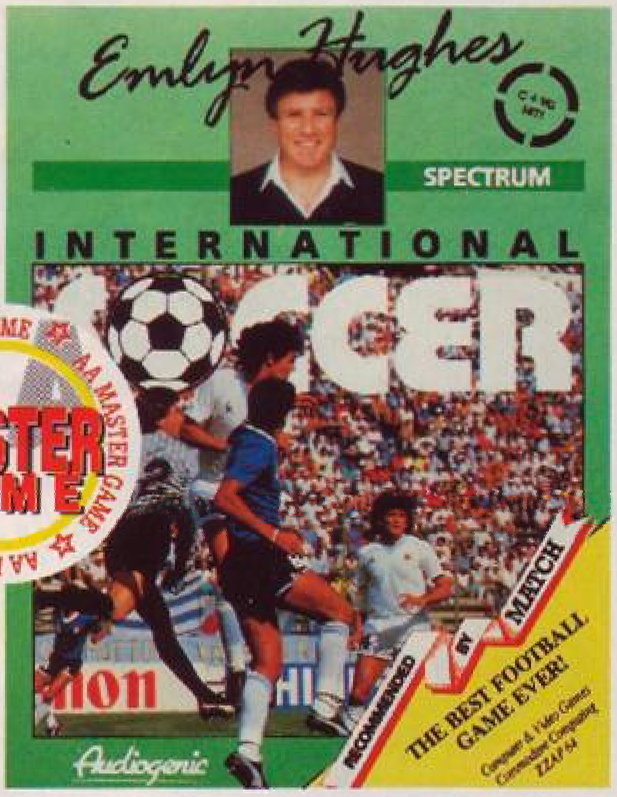
The best soccer game since Matchday II and Football Manager. With diving headers, free-kicks, throw-ins, goalkicks, corners, penalties and even barging: how more realistic can you get?
Enter your teams and set their skills, then manage them through the season.





"Your ain't played Footie on your CPC till you've mastered Emlyn!"
AA June 89

AA CUP WINNER RATING 93%



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FUN SCHOOL 2

● From Database/Mandarin

£6.95 tape £8.95 disk
(RRP £9.95/£12.95)

Bumper packages of educational software for infant and primary school age children. Fun School 2 comprises of three complete suites of eight programs.

"TEDDY BEAR" For Under-6's
Teddy Count, Teddy Bear Picnic, Colour Train, Find the Mole, Pick a Letter, Spell the Word, Shape Snap and Write a Letter.

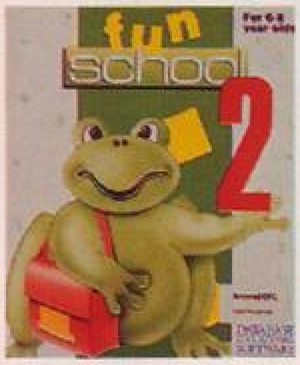
"FROG" For 6-8 Year Olds
Number Train, Maths Maze, Caterpillar, Shopping, Packing, Treasure Hunt, Number Jump and Bounce.

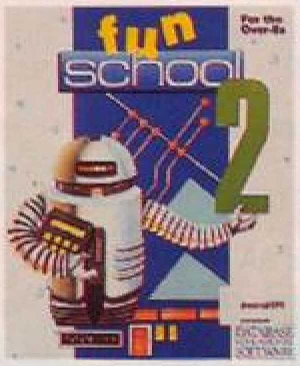
"ROBOT"For Over-8's
Logic Doors, Build a Bridge, Passage of Guardians, Unicorn, Escape, Souvenirs, Code Boxes and Mystery Machine

""Fun School 2 lives up to both parts of its title. It is fun, and your child will almost certainly learn too."
AA Issue 43.

Teddy	AmsCass	Order Code AA292AC
Teddy	Ams Disk	Order Code AA292AD
Frog	Ams Cass	Order Code AA293AC
Frog	Ams Disk	Order Code AA293AD
Robot	Ams Cass	Order Code AA294AC
Robot	Ams Disk	Order Code AA294AD







Gerry Anderson's THUNDERBIRDS

● From Grandslam

"Calling International Rescue, calling International Rescue!"
Play the game and listen to the theme on the audio tape. Taken from the Gerry Anderson classic TV series you must attempt to save some miners that have fallen to the bottom of a shaft. Using your superb Thunderbird range of aircraft and machinery, send the Tracy clan on this dangerous mission. With three more adventures including clahes with the infamous "Hood".
All the characters are here, including Lady Penelope with her pink Rolls Royce and loyal chauffeur, Parker.

"Thunderbirds has the kind of depth and long term appeal that I find really rewarding"
Steve Carey,
AA Issue 47.



SAVE £20

Ams Cass RRP £12.95
AA Price £8.95
Order Code AA295AC
Ams Dis RRP £14.95
AA Price £9.95
Order Code AA295AD

Look over page for details

SAVE £20

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BACK ISSUES

Expand your Amstrad Action Collection!

If you're one of the thousands of readers who've joined *Amstrad Action* only recently, you'll want to catch up on some of the good things you've missed. Here's how to do it. We have limited numbers of the back issues listed below, which we're selling at cover price with post and packing free.

ISSUES 1-22	SOLD OUT!
ISSUE 23	£1.25 • Launch of Word-Processing series. Utility Type-ins.
ISSUE 24	Two years of AA! Exolon. Word processors. Tas-Sign. More WIMPs.
ISSUE 25-28	SOLD OUT!
ISSUE 29	£1.25 • Six top printers reviewed. Spreadsheets.
ISSUE 30	£1.25 • Discovering databases. How to upgrade a 464 to a 6128.
ISSUE 31	£1.25 • CP/M software section starts. Basic programming reaches part five.
ISSUE 32	£1.25 • Educational software survey. CP/M on ROM. Word processing.
ISSUE 33	£1.25 • Loads of hardware projects! - joystick, splitter, I/O port etc. Comms.
ISSUE 34	£1.25 •Simulation software from space shuttles to bike..
ISSUE 35	£1.25 • Joy of hacking scrutinised! Buyers guide to computer books.
ISSUE 36	£1.25 • Micronet - worth it? Code Masters? Printer selection.
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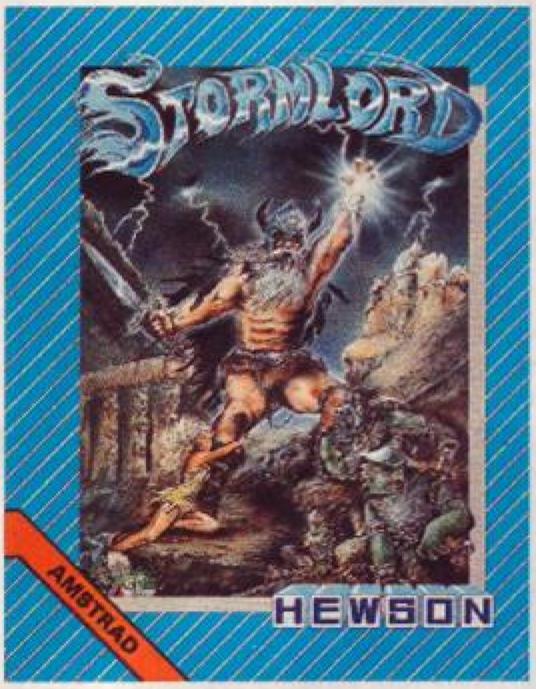
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